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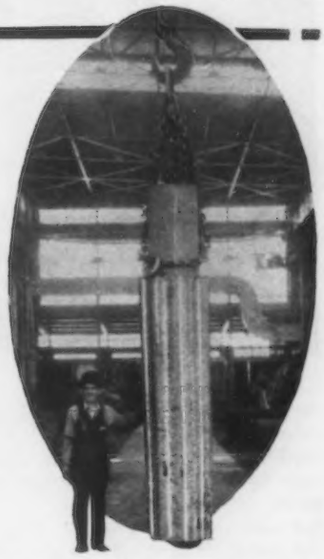

Making Large Bronze Ingots

Difficulties Overcome in Pouring and Machining Aluminum Bronze—Refinements Necessary in Heat Treating and Forging

BY JEROME STRAUSS*

ENGINEERING demands, in the case of large forgings of the simpler structural carbon and alloy steels, have caused a progressive growth of the size of ingots of these steels to a point such that further increase is nearly, if not completely, prevented. A limiting diameter has practically been established by cost factors (as influenced by discard loss, etc.) and by the properties of the steels themselves in respect to ability to secure soundness and reasonable homogeneity in larger cast masses.

Current practice in the more highly alloyed steels, such as the chromium and chromium-nickel corrosion resistant steels, have closely approached, for solid (not hollow) forgings, a similar limitation at considerably lower cross-sectional ingot dimensions. This difficulty of securing uniformity and central structural integrity will no doubt be overcome to a degree and limiting ingot sizes increased as our knowledge of these "younger" alloy steels is improved.

In the case of many of the non-ferrous alloys, however, maximum present ingot sizes have been established, not by limitations imposed by the properties of the metals, but by the absence of demand for large forgings. Ingots of duralumin, for example, have generally weighed not much over 400 lb., although a few have recently been produced at the Naval Gun Factory weighing slightly under 1000 lb., and there appears no reason for anticipating difficulties in casting sound, uniform ingots of this metal in somewhat larger sizes should the need develop.

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Currently manufactured commercial ingots of aluminum bronze generally weigh not in excess of 200 to 500 lb., according to the dimensions of the bars or sheets required, and in these commercial fields increase in ingot dimensions is likely to occur chiefly as the result of the production requirements of the chemical industries. For forgings of 4 to 6 in. diameter, the Naval Gun Factory has been pouring 10 to 12 in. diameter ingots weighing 1200 to 1500 lb. That no difficulties are involved in producing ingots of this metal weighing 15,000 lb. is illustrated by the facts recorded in this article.

How They Are Melted and Poured

TO date six such ingots of the nominal composition—copper 88 per cent, aluminum 9 per cent, iron 3 per cent—have been produced and the uniformly good quality of the forgings made from these ingots affords proof of the merit of the methods employed. These methods, particularly those used in casting, may appear totally at variance with the hitherto observed properties of this alloy, largely no doubt because those who have had experience with it have been confined to its preparation in small sections and small masses.

The molten metal for each ingot was prepared in 32 clay-graphite crucibles in coal-fired pit-type furnaces. The copper was first charged and melted, covered with a layer of charcoal and then deoxidized by successive small additions of 50:50 copper-manganese until a small test button, cast in core sand, showed satisfactory shrinkage on solidification. Half of the aluminum was

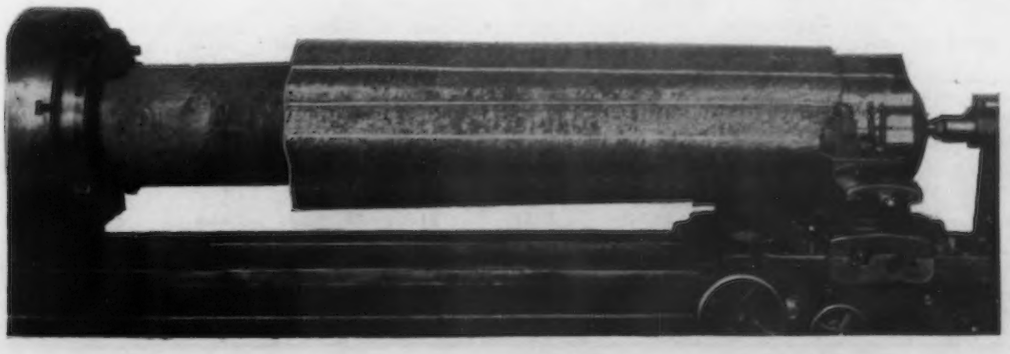


Fig. 1—15,000-Lb. Aluminum Bronze Ingot in Lathe

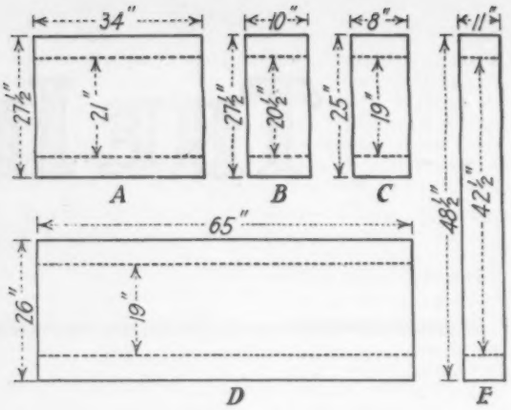


Fig. 2 (Left)—Illustrating Method of Machining Off Ingot Surface without Cutting Away Corrugations

Fig. 3—Typical Cylindrical Forgings Made from Aluminum Bronze Ingots

then added. When completely in solution, the full amount of clean iron sheets previously heated to about 1000 to 1200 deg. Fahr. was added. Solution of the iron was followed by the addition of the remaining aluminum. After solution was complete time was allowed for any oxides present to rise to the surface and for the metal to reach the desired casting temperature. In the case of the first three ingots the metal was cast into iron pig molds and subsequently remelted in the same equipment and superheated to the desired degree; for the last three ingots the melt was poured direct without pigging and remelting.

Pouring conditions are well illustrated by the details of operations on the second ingot. The total charge in the 32 crucibles was 15,100 lb. One 3-ton and one 6-ton brick lined steel foundry ladles were preheated and the contents of 6 of the crucibles poured into the smaller one. The metal in the smaller ladle was then lip poured into the larger one and the contents of 23 more crucibles poured into the pool of molten metal thus formed; this practice avoided stopper trouble that might have resulted from pouring individual crucible lots into the 6-ton ladle.

Table I—Record of Segregation in Aluminum Bronze Ingot Heat 7980-N

Sample No.	Lower Disk				Upper Disk			
	Location	Al	Fe	Cu	Location	Al	Fe	Cu
1	Surface	8.89	3.14	87.99	Surface	8.51	3.26	88.26
2		8.87	3.11	88.00		8.71	3.19	88.10
3		8.86	3.11	88.03		8.57	3.23	88.20
4		8.90	3.06	88.03		8.54	3.12	88.34
5		8.88	2.98	88.15		8.71	3.02	88.30
6		8.96	3.15	87.89		8.65	2.99	88.36
7		8.92	3.32	87.75		8.73	2.88	88.36
8		8.94	3.38	87.70		8.55	3.06	88.39
9		8.94	3.36	87.73		8.57	3.12	88.31
10		8.95	3.36	87.69		8.45	3.26	88.25
11		8.90	3.47	87.64		8.61	3.54	87.85
12		8.89	3.47	87.65		8.76	3.50	87.74
13	Center	8.84	3.47	87.68		8.68	3.61	87.71
14					Center	8.55	3.64	87.81

Temperatures Vary

The temperature of the metal in these crucibles varied from 2040 to 2100 deg. Fahr. Six minutes were allowed to elapse between the filling of the ladle and the beginning of teeming. This was initiated by opening the nozzle of the large bottom-pour ladle just slightly at first and then gradually increasing the rate of flow to nearly the full capacity of the 2-in. nozzle. Teeming required 8 min., the optical pyrometer indicating a metal temperature of 1980 deg. Fahr. at the start and 1970 deg. Fahr, at the finish. The ingot mold was at not over 100 deg. Fahr. at the beginning of teeming. A thermocouple immersed in the metal immediately after completion of this operation gave a temperature indication of 1955 deg. Fahr. The 29 pots introduced in this manner resulted in a metal level just above the bottom of the sink-head. Three to five minutes after teeming, two additional pots of metal were added and the surface covered with charcoal. Twenty-five minutes later the charcoal was removed, the last pot of metal added, and a new layer of charcoal applied. Solidification was complete 20 min. later and in the 34-in. high sink-head was an open cavity 11 in. deep at the center with some porosity visible up to 9 in. further into the ingot. Subsequent ingots were made with hot tops 22 to 24 in. high.

The ingot mold used was that commonly employed for electric furnace steel ingots. It forms a corrugated big-end-up ingot with a minor diameter of 23½ in. and major diameter of 25 in. at the small end, correspond-

Table No. II—Effect of Forging on Tension Properties of Aluminum Bronze Ingot 8669-N (24-In. Corrugated)

All material annealed 1400 deg. Fahr. (30m), air cooled.

T—Transverse. L—Longitudinal.

Bar No.	Bar Location		Elastic Lim., Lb. per Sq. In.	Prop. Lim., Lb. per Sq. In.	Yield Pt.,* Lb. per Sq. In.	Tens. Str., Lb. per Sq. In.	Elong., Per Cent in 2 In.	Reduc. Area, Per Cent	Fracture
BW-191	10 in. sq.—Surface	T	23,200	22,400	32,100	77,700	45.8	47.0	Irreg.
192	10 in. sq.—Center	T	22,400	20,400	30,300	76,900	41.8	41.3	Irreg.
BW-195	7 in. sq.—Surface	T	17,800	17,800	29,500	76,600	38.3	32.1	Irreg. (a)
196	7 in. sq.—Center	T	13,800	15,300	30,100	76,600	47.5	44.9	Irreg.
BW-193	4 in. sq.—Surface	T	21,400	20,400	31,100	77,900	43.5	45.8	Irreg.
194	4 in. sq.—Center	T	21,100	20,400	30,800	78,400	42.8	47.9	Irreg.
BW-199	2 x 4 in.—Center	T	29,300	30,600	38,700	84,500	40.0	44.9	Irreg.
BW-197	1 x 4 in.—Center	T	26,700	25,500	38,200	84,300	45.1	53.8	Irreg.
198	1 x 4 in.—Center	L	31,100	30,600	39,700	84,800	44.1	55.1	Irreg. part shear

*Stress to produce elongation (under load) of 0.5 per cent.
(a) Broke in gage mark.

ing diameters of 25 and 26½ in. at the large end, and a cylindrical hot top 19 in. in diameter. The length of the corrugated portion of the ingot is 7 ft. 10 in. The stool contains a central cup shaped depression 19 in. in diameter and 5½ in. deep to aid in minimizing splashing. The ratio of ingot mold sectional area to ingot sectional area ("chill ratio") is 3 to 1 at top and bottom of this mold.

Methods of Machining and Forging

A LAYER of oxide mixed with metal existed at the surface of the ingot and this was removed before forging. After cooling in the mold the ingot was transferred to a lathe as shown in Fig. 1. To machine off the ⅝ in. of drossy metal without cutting away the corrugations, with the attendant loss of sound metal, a special arrangement was employed. The lead screw in the tool post carriage was removed and a steel-wire rope attached at one end to the tool post and at the other to the short arm of a 1-10 lever with its fulcrum on the opposite extremity of the carriage; a 200-lb. weight on the long lever arm served to hold the tool rigidly in contact with the work. The position of the tool post was maintained by a roller set in an arm that was clamped to the tool post just in advance of the tool. The tool projected ⅝ in. beyond the roller and its cutting edge was on a level with the axis of the roller. The arrangement is shown in Fig. 2 with the roller at A and the lever arm weight at B. The lathe was rotated clockwise with the tool nose pointing downward.

Solid, short ring and tubular forgings have been made from these ingots. The initial temperature of melting of this aluminum-iron bronze is about 1875 deg. Fahr. Heating temperatures for forging, as generally practised at this plant, are 1640 to 1680 deg. Fahr., and finishing temperatures 1340 to 1400 deg. Fahr. This is a narrow forging range, but it is very necessary that it be observed especially in mandrel forging. For simple solid forgings the lower limiting temperature is not as vital. In mandrel forging small checks are readily opened into gaping cracks and in solid forging, when lateral restraint is insufficient, internal shearing occurs if appreciable working is performed at too low a temperature. The heat in the metal appears to dissipate rapidly and frequent reheating is required; perhaps this is related to its thermal conductivity and perhaps it is in a measure the narrow forging range that creates this impression.

There is little difference between the forging practice required for this alloy and that of most other nonferrous alloys. Forging of bars (also shafts, rods, etc.) is best carried on by producing squares in V dies, and rounds by working such squares in swages, particularly in the final stages and when the metal temperature is low. Mandrel forgings have been made from a blank prepared by punching out the core of a thick disk cut from the ingot by sawing, after having worked the disk slightly to form a cylinder of greater length and smaller diameter. The hole left by this method is quite frequently very rough and somewhat torn for a short distance below the surface; this is an obviously undesirable condition in starting mandrel forging. If, however, a punch is forced into the afore-noted slightly worked cylinder while resting on a solid die (crowding the metal so that increased cylinder diameter results) until the punch reaches to within 2 to 3

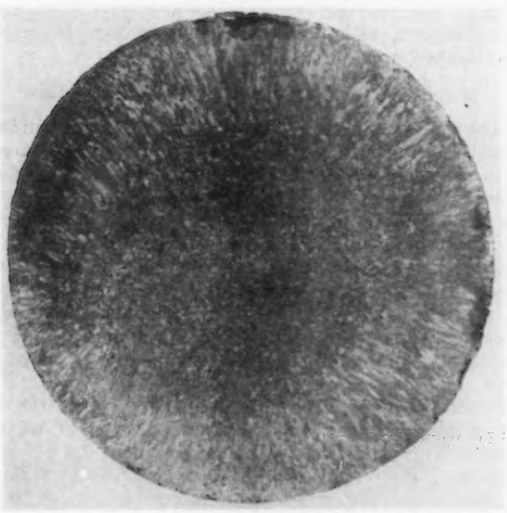


Fig. 4 (Right)—Section of Head of Ingot (Longitudinal)

Fig. 5—Section of 10-In. Aluminum Bronze Ingot (Transverse) Etched

Table No. III—Effect of Forging and Annealing Temperatures on Physical Properties of Aluminum Bronze

Forged from 10-in. ingot. T—Transverse. L—Longitudinal.

Bar No.	Bar Location	Heat Treatment, Deg. Fahr. (Min.)	Elast. Lim., Lb. per Sq. In.	Prop. Lim., Lb. per Sq. In.	Yield Pt.,* Lb. per Sq. In.	Tens. Str., Lb. per Sq. In.	Elong., Per Cent in 2 In.	Reduc. Area, Per Cent	Fracture
BW-199	2 x 4 in.—Center L	None	17,800	17,800	31,600	82,800	41.8	39.2	Ir. Shear
200	2 x 4 in.—Center T	None	18,300	17,800	31,100	81,200	41.0	38.9	Ir. Shear
BW-201	2 x 4 in.—Center L	1400 (30) Air Cooled	15,300	15,300	28,500	81,200	46.3	39.2	Irreg.
202	2 x 4 in.—Center T	1400 (30) Air Cooled	12,700	12,700	27,200	76,400	34.3	36.0	Irreg.
197A	1 x 4 in.—Center L	None	30,600	30,600	46,600	88,400	35.0	47.0	0.5 Cup
198A	1 x 4 in.—Center T	None	33,100	33,100	47,800	89,900	31.3	49.0	0.6 Cup
203	1 x 4 in.—Center L	1400 (30) Air Cooled	32,300	30,600	40,500	85,600	41.7	56.7	0.5 Cup
234	1 x 4 in.—Center L	1550 (30) Air Cooled	25,500	25,500	36,700	87,900	38.5	46.7	Shear
235	1 x 4 in.—Center L	1700 (30) Air Cooled	10,700	10,200	27,000	87,300	40.3	49.0	Irreg.

*Stress to produce elongation (under load) of 0.5 per cent.

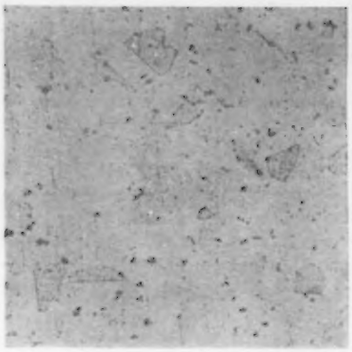


FIG. 7A

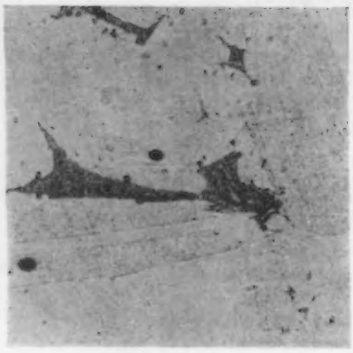


FIG. 7B

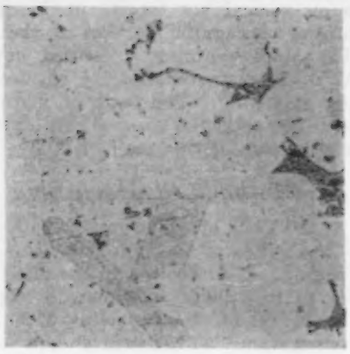


FIG. 7C

Fig. 7A—Microstructure at Surface of Upper Disk (X 100)
Fig. 7B—Microstructure 8 In. from Surface of Upper Disk (X 100)
Fig. 7C—Microstructure at Center of Upper Disk (X 100)

in. of the base of the cylinder, the disk remaining may be punched out with very little tearing. The ring and tube forgings shown in Fig. 3 have been made from these 15,000-lb. ingots, some having been prepared by both of the methods described.

Properties of the Ingots Discussed

Six ingots thus far produced by this practice have shown the following ladle analyses:

Heat No.	Aluminum Per Cent	Fe Per Cent	Cu Per Cent
7980-N	8.67	3.30	88.05
8669-N	9.12	3.18	87.60
9183-N	8.42	3.21	88.33
82-P	8.75	3.17	88.10
1041-P	8.93	3.31	87.77
1512-P	9.07	3.22	87.70

It has been possible without sacrifice in quality or physical properties to use the metal up to the base of the sink-head. The metal is sound for a short distance above this point, then shows some porosity and finally a pipe cavity, as illustrated in Fig. 4 (Heat 7980-N).

From this first ingot two full cross-sections (½ in. disks) were obtained, one 16 in. above the bottom of the corrugated portion of the ingot and the other 8 in. below the top of the corrugations or bottom of the sink-head. Neither showed the columnar crystals typical of ingots made in smaller molds and thus effectively chilled (Fig. 5) and neither showed any signs of piping. A radial strip (etched with ferric chloride) was cut from the lower disk and extending to just beyond the ingot axis and a similar strip from the upper disk. Chemical analyses were made on both disks at intervals of one inch (using a ½-in. drill for sampling); the results are recorded in Table I, samples having been numbered consecutively beginning with 1 at the surface.

An extremely fine structure was found in the lower disk at the surface, one somewhat coarser than at the center with slightly greater coarseness at about ⅔ radius from the center. The analyses of this disk, allowing for normal analytical error, show practically no variation in aluminum content, but a sharp peak in the copper content curve and a corresponding depression in the curve of the iron percentage, occurring about one inch nearer to the center than the beginning of the coarse-grained zone.

The second disk contains a band of coarse crystals, quite like but even coarser than those in the other, but in this disk about half way between center and surface; also a greater difference exists between the grain size in this band and that at the center. Reference to Table I shows again as in the lower disk, a drop in iron content on passing radially from the surface followed by a sharp increase toward the center. In this upper disk the center of the coarsely crystalline zone is about one inch nearer the ingot center than the zone of minimum iron content and the beginning of the coarse grained zone (as in the lower disk) about one inch nearer the surface. The aluminum percentage is likewise reasonably constant, although the total variation is greater than in the lower disk.

Microstructure Parallels the Macrostructure

The microstructure parallels the macrostructural changes, as recorded in Fig. 7, the smallest and largest grain sizes corresponding in location to the finest and coarsest areas of the macrostructure. Also the grain size is inversely related to the number of iron-constituent crystallites. The prevalence of alpha solid-solution and almost complete absence of alpha-delta eutectoid at the ingot surface is probably due to chill, for, after annealing at 1600 deg. Fahr., the latter constituent is present in about the same amount as at the ingot center, although, of course, in a finer state of division.

Pending the results of further inquiry into the nature of these segregations, an explanation of all the features is not offered. In this alloy about 2.5 per cent of the iron[1] is in solution; the balance forms as rosette-shaped crystallites prior to solidification, or at least complete solidification of the beta solid-solution.

The zone of minimum iron content drawing closer to the ingot axis, with rise in position in the ingot, and the concentration of iron at the axis may result in part from rejection of the solidified crystallites toward the center as the solid solution freezes and in part as a result of convection currents just prior to solidification. Other factors also may exert an influence, such as liberation of gases upon solidification (aluminum bronze evolves large volumes of gas) and the agitation of the molten metal during pouring.

The microstructure combined with the analyses indicates a possible, but not great, increase in dissolved iron on passing from the surface to the center of the ingot. Where the iron content is below 3 per cent, the primary crystallites are few and where it is much above 3 per cent they are numerous. They would, of course, serve admirably as centers for crystallization at the time of solidification and of transformation and would thus both indirectly and directly influence the size of crystalline grains existing at room temperature after passing through the two transformations in cooling[1].

The quality of the ingot may be judged from a series of tests made on bars forged longitudinally (in respect to the ingot axis) from a 6-in. thick disk cut 25 in. below the bottom of the sink-head. After forging to a 10-in. square and annealing for 30 min. at 1400 deg. Fahr., followed by air cooling, a transverse slice was cut from the metal and surface and central tension tests taken. The fracture of this slice (Fig. 8) presents a most uniform appearance. The remainder was then forged to 7 in. square, annealed and tested in a similar manner; the procedure was repeated for 4 in. square. The remainder was reduced to a 2 x 4-in. bar, similarly annealed, and a central test bar cut; this was also done after reducing to a 1 x 4-in. section, followed by annealing, but in this case an edge longitudinal bar was likewise prepared. The results appear in Table II. These exceptional transverse ductility values, with practically negligible differences between properties at center and surface of bars or between the transverse and longitudinal directions, point to almost isotropic metal

[1] Aluminum Bronze, by Jerome Strauss — *Transactions* American Society for Steel Treating, Vol. XII (1927), pages 69 and 239.

masses and are evidences of the excellent quality of the product. All of the broken bars, except the central ones from the 7 and 10-in. squares, which had a wrinkled appearance slightly resembling that of the slowly cooled cast alloy, possessed an extremely smooth surface similar to that on rolled steel test bars.

Properties of the Forgings Presented

OTHER than the experimental solid forgings just described, these large ingots were formed entirely into rings and tubes according to Fig. 3. These were all subjected to transverse tests, in some cases bars being selected from both ends of the forging. The minimum, maximum and average values obtained in 38 such tests were:

	Yield Point, Lb. per Sq. In.	Tensile Strength, Lb. per Sq. In.	Elongation, Per Cent in 2 In.
Minimum	30,000	75,100	22.8
Maximum	44,800	86,900	41.3
Average	34,600	80,600	33.8

These values may be compared with those obtained both longitudinally and transversely on forgings of all sizes made from 10-in. ingots of this alloy; the data below were obtained from 74 such tests representing two years' output under a moderately low work load:

	Yield Point, Lb. per Sq. In.	Tensile Strength, Lb. per Sq. In.	Elongation, Per Cent in 2 In.
Minimum	31,200	73,100	22.0
Maximum	46,300	93,500	49.5
Average	37,100	80,600	35.4

The yield point in all of these production tests was determined by drop of the beam of the testing machine; this value averages about 5000 lb. per sq. in. above the stress required to produce an elongation (under load) of 0.5 per cent on the standard tension bar; the latter has been used in the experimental tests. All of the minimum values did not occur on the same bar; the aluminum is reached and then only in rather thin sections. As the aluminum is increased above this amount, the ability of the alloy to harden increases rapidly. The figures quoted below were obtained on a tube of the form of D of Fig. 3 (made from heat 82-P):

	Yield Point, Lb. per Sq. In.[a]	Tensile Strength, Lb. per Sq. In.	Elongation, Per Cent in 2 In.
As forged	32,100	79,800	32.0
	29,500	77,400	34.3
1720° F. water	44,800	84,500	33.0
740° F. air	42,900	86,900	35.0

[a] Yield point by drop of beam.

Similar results were secured on forged blocks of ingot 8669-N, measuring 4½ x 11 in.:

	Yield Point, Lb. per Sq. In.	Tensile Strength, Lb. per Sq. In.	Elongation, Per Cent in 2 In.
As forged	34,600[a]	86,100	33.3
1500° F. water	35,700[a]	78,200	45.0
1500° F. water	34,600[a]	77,700	47.3
1500° F. water	29,500[b]	76,600	46.0
1500° F. water	29,800[b]	78,200	44.0
1720° F. water, 700° F. air.	40,700[a]	89,100	39.7
1720° F. water, 700° F. air.	41,800[a]	90,400	37.5
1720° F. water, 700° F. air.	32,300[b]	90,700	41.3
1720° F. water, 700° F. air.	31,300[b]	89,400	40.3

[a] Yield point by drop of beam.
[b] Yield point by extensometer (0.5 per cent while under load extension).

It will be noted that in the latter tests the increase of 0.3 per cent aluminum has more than offset the 30 per cent increase in thickness and resulted in somewhat greater tensile strength on quenching and tempering.

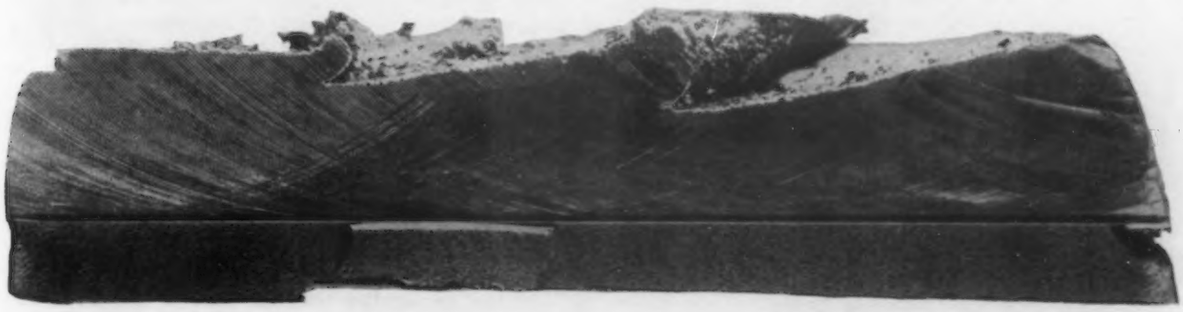


Fig. 8—Transverse Fracture of 10-In. Square Forged from 15,000-Lb. Ingot

same is, of course, true of the maxima. These tests again reflect the quality of the large ingots.

Proper Heat Treatment Outlined

THE elastic properties of the forgings are greatly dependent upon the finishing temperature used in working. This in turn may be limited by the method of forging and shape of the objects required; simple forms may be finished colder than intricate ones and hammering carried out at lower temperatures than pressing. The influence of these forging conditions is not effaced by low-temperature annealing, although severe strains produced in working and which might result in deformation during machining or use, may be removed by such heat treatment. The 2 x 4-in. bar of Table III was finished much hotter than the 1 x 4-in. bar. The 1400 deg. Fahr. annealing produced slight softening in both, but did not remove the great difference in elastic properties; to effect such a change, temperatures approaching 1600 to 1700 deg. Fahr. are required. The need for finishing temperature control in maintaining high elastic values is thus demonstrated. Reference to Table II will show that the 7-in. square was finished quite hot and the small sections relatively cold.

Theoretically, aluminum bronzes containing over 7.5 per cent of aluminum (and slightly less when substantial amounts of iron are present) should increase in hardness upon suitable heating and quenching. Practically this effect is not obtained until 8.5 per cent

Economies in Simplified Practice

Seventy-seven industries have cooperated with the Division of Simplified Practice, Department of Commerce, and found annual economies totaling many millions of dollars in eliminating unnecessary sizes and types of their products, according to a statement issued by E. W. Ely, acting chief of the division. These industries also have improved quality and service without sacrificing profits, individual genius or inventive ability, it is pointed out. Wastes in American industry which are preventable have been estimated to exceed $10,000,000,000 annually, a sum which is more than half of the tentative valuation of American railroads and more than half of the savings bank deposits.

Varieties of Steel Barrels

WASHINGTON, Dec. 6.—The standing committee of the steel barrels and drum industry will meet tomorrow at the Athletic Club, Cleveland, for the purpose of revising or reaffirming Simplified Practice recommendation No. 20, dealing with steel barrels and drums. The original recommendation, as developed by the industry, reduced the varieties of the commodities from 66 to 24, an elimination of 64 per cent. The Division of Simplified Practice, Department of Commerce, will be represented at the meeting by H. R. Colwell.

The Chicago Rapid Transit Co. has placed with the Bethlehem Steel Co. a second order for Sandberg sorbitic steel rails—200 tons of 90-lb. ASCE section.

Piston Molding Conveyor Units

Mold Conveyors, Hooded Cooling Conveyors and Sand Handling System — Much Labor Saving in Automobile Foundry

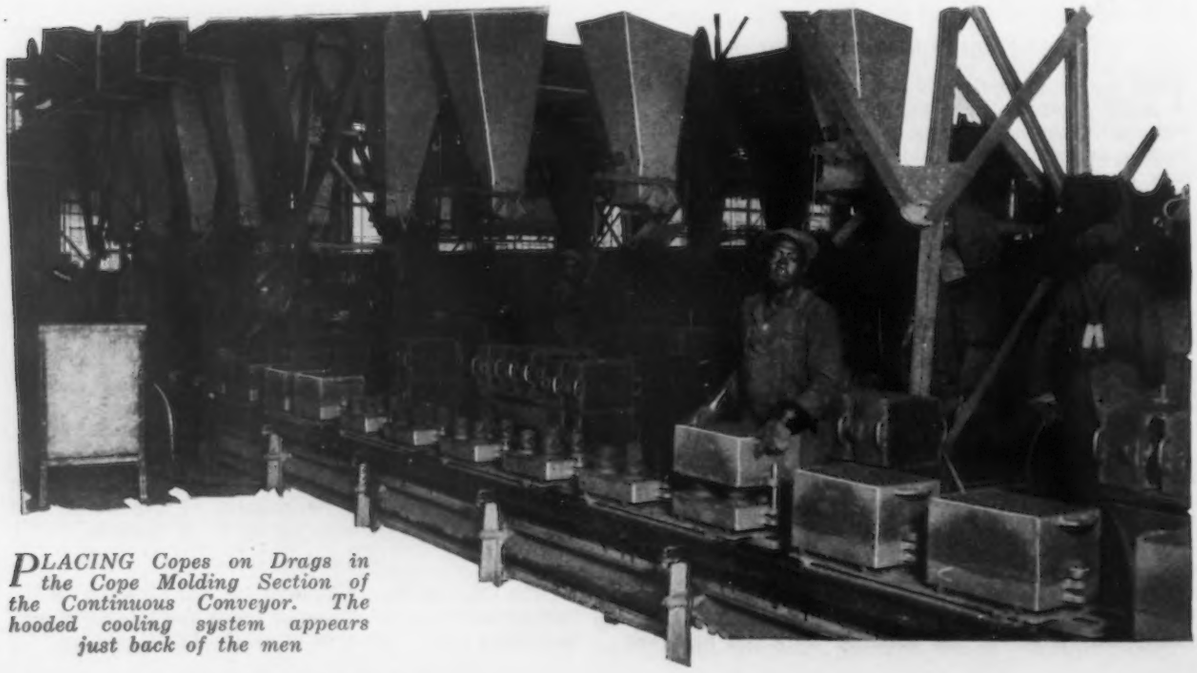
DESCRIPTION of the foundry mechanical equipment for the Buick Motor Co., Flint, Mich., was covered in considerable detail in THE IRON AGE of Nov. 3 and Nov. 17. The stories there given, however, did not explain the piston molding equipment shown by the illustrations in this issue. These units consist of two complete mold conveyors and hooded cooling conveyors, with two lines of molding machinery served by a single sand-handling and preparing system. They are located in front of the line of cupolas and across the end of the six large molding units, which are devoted principally to cylinder blocks.

Molds are turned over and shaken out at the end of the cooling run mold conveyors, as shown in one illustration. The shaking out is done by hand, while the bottom boards follow the curved section of the conveyor and thus back to the molding floor. The flasks are returned to the molding station by a short booster conveyor to an inclined gravity conveyor passing the line of machines.

Sand and castings from the shake-out station are delivered through the floor to two apron conveyors. They are thus passed to a semi-tumbler and screen, in which the sand and the piston castings are separated. The castings receive here a preliminary tumbling, whereupon they are discharged to an inclined apron conveyor. This carries them outside the building, delivering them into boxes which are handled by lift trucks and in which they are carried to the cleaning room.

Sand from the semi-tumbler is discharged from the screen to a belt conveyor, which has a magnetic head pulley to separate out metallic refuse. The sand is delivered to a bucket conveyor, which handles it through the floor and discharges it into the preparation unit over the sand storage bin.

In the preparation unit the sand is tempered and fed to a 24 in. twin-paddle mixer. Thence it goes through a Link-Belt revivifier, which delivers a thoroughly mixed and prepared sand to the 100-ton storage



PLACING Copes on Drags in the Cope Molding Section of the Continuous Conveyor. The hooded cooling system appears just back of the men

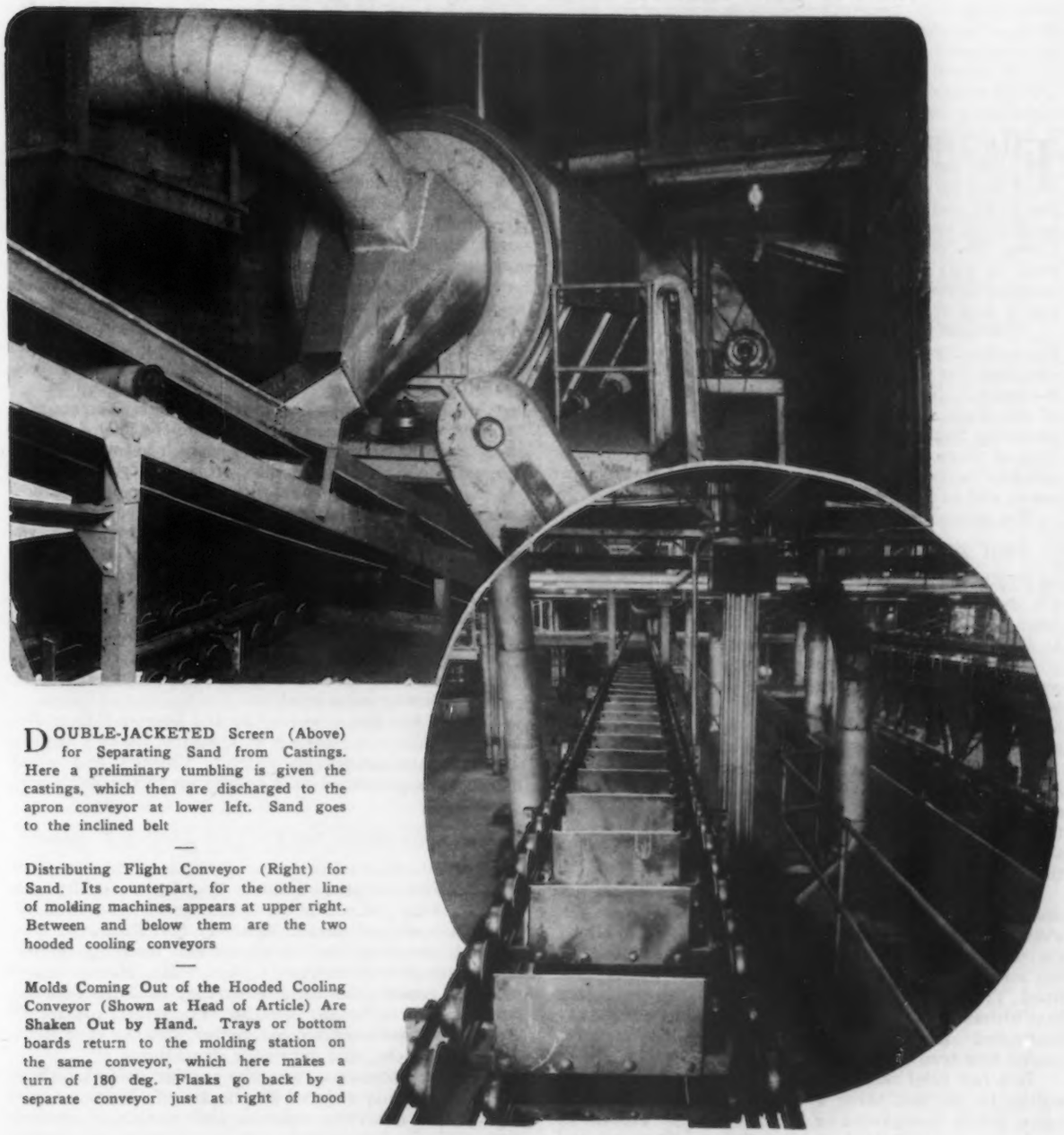
bin. Feed of sand from this bin, controlled by a reciprocating bar feeder, carries it to an inclined belt conveyor and bucket elevator on which it again moves overhead. The elevator discharges it, at a split feed, to the two molding units, by means of a short belt conveyor.

Prepared molding sand is distributed to the hoppers over the molding machines by the two flight conveyors, one of which is shown in one illustration. It will be noted that the conveyor chains are set well outside of the conveyor trough and arranged to run on tee-rails. This is to insure freedom from sand getting into the chain joints and causing undue wear. These flight conveyors deliver the sand automatically to the molders' hoppers through adjustable openings in the trough bottom. The molders run the sand into their flasks by means of the undercut gates at the hopper bottom.

Drags made on the first machines are set on the moving mold conveyor trays, two to each tray or bottom board. In this shape they are carried past the cope machines, where the molds are closed on the moving conveyor. This procedure is shown in one illustration. After weights are placed on the molds they are poured from hand ladles. The weights after removal are returned to their starting point on a section of roller conveyor.

Immediately after pouring, the molds enter a closed hood fitted with an exhaust system to remove gas and smoke. The mold conveyor turns the trays around a curve of 180 deg. and sends them automatically into this cooling conveyor. Two such covered conveyors, one to each molding line, pass between the two molding lines to reach the shake-out station already noted.

All of the conveyors whose operation is described above were designed, built and installed by the Link-Belt Co., Chicago.



DOUBLE-JACKETED Screen (Above) for Separating Sand from Castings. Here a preliminary tumbling is given the castings, which then are discharged to the apron conveyor at lower left. Sand goes to the inclined belt

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Distributing Flight Conveyor (Right) for Sand. Its counterpart, for the other line of molding machines, appears at upper right. Between and below them are the two hooded cooling conveyors

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Molds Coming Out of the Hooded Cooling Conveyor (Shown at Head of Article) Are Shaken Out by Hand. Trays or bottom boards return to the molding station on the same conveyor, which here makes a turn of 180 deg. Flasks go back by a separate conveyor just at right of hood

Fewer Locomotives Shipped

Railroad locomotives shipped in November numbered only 52, according to reports of the Department of Commerce. This is the smallest number in many months, comparing with 112 in October and with 128 a year ago. For the 11 months, the total has been 1002, compared with 1570 in the first 11 months of 1926.

Of the total in November, 38 were for domestic service and 14 for export. Seven of the domestic and six of the export shipments were electric, the remainder being steam. Unfilled orders at the end of the month dropped to 145, compared with 517 a year ago. Of the recent total 116 were for domestic service and 29 for export, of which 42 domestic and four export were electric units.

Electrifying the Hardening Room

100 Per Cent Electric Heat Treatment of Steel Practiced in Some Plants—Economic and Other Advantages Brought Out at Yale Conference

ELECTRIFICATION of the hardening room and 100 per cent electric heat treatment of steel by two large companies were the features brought out at an industrial conference on electric heat treatment held last week at Yale University, New Haven, Conn. The discussion of the general theory of electric heat, as well as the presentation of its advantages by manufacturers of electric heat-treating equipment, was also a part of the program.

Sponsored by the Manufacturers' Association of Connecticut and by Yale University, the conference was arranged for the morning, afternoon and evening of Wednesday, Nov. 30. In the morning, three members of the Yale faculty presented the scientific and engineering background. In the afternoon, representatives of three makers of electric heat-treating furnaces and two users of such furnaces presented their arguments and experiences.

The attendance at the sessions approximated 200.

Pratt & Whitney Hardening Room Equipment

AFTER the presentation of the various addresses at the morning and afternoon sessions about 130 sat down at a banquet at the Lawn Club, presided over by L. H. Bahney, Scovill Mfg. Co., Waterbury, Conn. The message of greeting was extended by E. Kent Hubbard, president of the Manufacturers' Association of Connecticut. He reviewed particularly the relations which have developed in the last two or three years between the research committee of his organization and the Yale faculty, whereby many industrial and technical problems have been solved for manufacturers by the professors and their students. He considered the present conference a splendid testimonial to the mutual value of the cooperation established between the university and the business men of the State.

The feature of the evening's program was an address on the "Hardening of Small Tools," by A. H. d'Arcambal, consulting metallurgist Pratt & Whitney Co., Hartford, Conn. Only a few years ago at one of the national conventions of the American Society for Steel Treating, Mr. d'Arcambal made the prediction that ultimately the hardening room would be completely electrified. His address at the meeting last week revealed how true his prophecy was.

In a few brief remarks Mr. d'Arcambal told to what extent in the last three or four years the hardening room, which is regarded as the heart of the process of producing small tools, had been changed from oil and gas furnaces to electric furnaces, outlining at the same time some of the results and advantages obtained.

At present, all the heat treatment of the company's small tools is carried out in electrically heated furnaces, with the exception of those which are used for high-speed steel. As regards such tools, experiments are now under way with a furnace using "globar" resistors to ascertain whether such equipment can be depended upon to attain the necessary high temperature which is not secured by the ordinary resistors used in other equipment. The latest design of cooled terminals for the globar resistors is being employed and the results thus far are highly favorable. Mr. d'Arcambal surmised that experiments will warrant the use of electric furnaces for high-speed steels. This would mean the complete electrification of the hardening room.

Experience with Electrically Heated Lead Pots

The steps which have led up to the present situation were interestingly outlined by the speaker. About four years ago an electrically heated lead pot was obtained and its operation carefully watched. It was found that, while the electric heat cost about 25 to 30 per cent more than the oil for the old style fuel-fired furnaces, this was more than offset by the quality of the product obtained because of closer regulation of temperature and the necessity to use less labor to bring the furnaces to temperature at the beginning of each day. As a result, the company now has 14 such furnaces in operation in its hardening department. It has also installed two box-type electric furnaces and a rectangular lead bath furnace for drawing high-speed steel, in which about 5000 lb. of lead is maintained at a definite temperature.

Mr. d'Arcambal emphasized particularly the superior quality which has been possible from the use of electric heat and the savings in labor, as well as other advantages. He cited the fact that, after it had been decided to install electrically heated lead pots, it was found possible to clean the hardening room of its several years' accumulation of dirt and soot and to maintain the newly painted white walls of the interior of the room indefinitely. Some interesting testimony regarding the life of the alloy lead pots was given by the speaker. One of these pots, installed about three years ago, is still in excellent condition and it would be difficult to distinguish between it and a new pot. In former practice it had been necessary to use thick cast steel pots, whose life was quite brief.

The $7,000 film prepared by the Detroit Edison Co., entitled "Electric Heating in Industry," which depicts various installations in Detroit, Chicago and other places, was presented as a conclusion to the day's conference.

Two Plants Report 100 *Per Cent Electric Treatment*

STATING that 95 per cent of the heat treatment of steel in his plant is now done by electricity and that by Feb. 1 it will be on a 100 per cent basis, H. E. Martin, assistant metallurgist Dodge Brothers, Inc., Detroit, described the equipment and methods of heat treatment at his company's plant. Mr. Martin stated that the reasons for using electricity could be enumerated under six heads: Quality of product, control of heat, less maintenance costs, better working conditions, lower rejections, and automatic operations.

As to maintenance costs, the speaker said that these had been greatly reduced by the use of electricity, and that it was generally conceded that quality of product and control of temperature were features of electric heat treatment. In his plant, normalizing, carbonizing, hardening and drawing, and miscellaneous annealing and heat treatment are done by electricity. Only part of the cyaniding is accomplished by electricity, but plans are on foot to do all of this electrically by Feb. 1.

The Dodge company uses 7500 kw. and treats about 450,000 lb. of metal per day. There are in existence 32 box-type furnaces, 24 quenching furnaces, 16 drawing furnaces and 6 furnaces of the pusher type, all electrically heated. There has recently been installed a pair of furnaces for annealing gear blanks, which, it has been found, must be heat treated so as to have a microstructure of a definite nature to obtain the best results. With an output of about 1700 cars per day, Mr. Martin said the cost was about 0.4c. per lb. for the electricity. At the conclusion of his address, Mr. Martin presented slides showing the various types of furnaces used in the Dodge Brothers plant.

Stating that the strength of his company's product had been increased as much as 50 per cent by electric heat treatment, John J. Harman, research engineer Wal-

worth Co., Boston, discussed electric annealing of Stillson wrenches and other forgings, and said that a special furnace for special purposes is usually needed. It had been found that, for the wrenches made by his company, spheroidized cementite should be the prevailing structure in the steel for this purpose. Before installing the electric furnace, views of which Mr. Harman presented during his address, it had been found that the heat treatment of these forgings with the use of oil at 6½c. a gal. had cost $13.63 per ton. With the use of the electric furnace this cost had been brought down to $7.83 per ton, with electricity at 1¼c. per kw., thus insuring a saving of $5.80 per ton. This saving had been found to be 10 per cent more than was estimated when the furnace was installed.

Production Costs Reduced by Electricity

Three representatives of makers of electric heat-treating furnaces also spoke at the afternoon session. C. L. Ipsen, engineer, General Electric Co., Schenectady, N. Y., took as his subject "How Electric Heat Treatment Affects Production Costs." The only challenge to electric heat is that of cost, said Mr. Ipsen, but the item of fuel and furnaces, while higher for electric heat, is not the only one in the question of cost. The speaker discussed the merits of fuel oil and gas, dwelling particularly upon the 100 per cent efficiency of electricity, as compared to an average efficiency of only about 40 per cent for fuels in general. He stressed the fact that care should be exercised in considering efficiency. More important still, in his estimation, is the question of standby losses which decidedly favor the electric furnace.

Another consideration is the heating of extraneous metals, which, in electric furnaces, is decidedly cut down. As an illustration of this Mr. Ipsen described the electric heat treatment of punchings for transformers at one of the plants of his company. With the use of fuel, oil or gas, a pound of container boxes was necessary for every pound of material heat treated, but in the case of electricity, such containers are eliminated. It had been found that with oil the cost of annealing punchings was 16½c. per cwt., but with electricity the cost was 13½c. Discussing the electric annealing of gears at one of his company plants he stated that over a period of time electric heat treatment averaged about 2 1/10 mills per lb., which compared with three mills when oil was used.

Another factor affecting ultimate costs is labor, said Mr. Ipsen. A great advantage of the electric furnace is that it can be placed in almost any location in a plant, thus cutting down the necessity of moving material from one department to another, as in the case of oil or other fuel-heated furnaces. He stated also that quality of product should be considered in the ultimate cost and that over a long period the experience of his company had shown that the electric heat treatment of tools, dies, gears and other materials would average not over ½ of 1 per cent of the total cost of the product. His company is using, he said, about 40,000 kw. in its electric heating equipment, with a consumption of about 80,000,000 kwhr. per year. Mr. Ipsen concluded his interesting address with the presentation of slides showing various furnaces used by his company.

Cost of Electric Furnace Heat Known

Taking as his subject "Electric Furnaces for Heat Treating," Wirt S. Scott, special representative, Westinghouse Electric & Mfg. Co., Mansfield, Ohio, discussed this general phase of the subject. He stated that electric heating is not confined to the automobile industry as is often supposed, but that its ramifications are very wide, not only for heat treating, but for other industrial uses. The cost of operating such furnaces is known better than that of any other industry, he claimed, and these costs can be figured with a great degree of accuracy. He said it was quite generally the custom now for companies to call on the electric companies for information, and he advised that such companies determine first the cost of heat treatment by fuel and then consult with the electric industrial heating engineer. Guarantees are now possible on electric heat-treating equipment equal to the guarantees on electric motors which have been prevalent for some time. He concluded his address with an exhibition of slides of different types of Westinghouse furnaces.

Labor Saving from Continuous Furnaces

Another phase of the subject was presented by R. E. Talley, president and chief engineer, George J. Hagan Co., Pittsburgh, who discussed "Labor Saving Resulting from Continuous Automatic Electric Furnaces." Mr. Talley said that while there are in existence many fine automatic combustion furnaces, the same refinement in such furnaces is not as attainable as in electric automatic furnaces. Of course, the labor saving in such furnaces is a large item, particularly as to cost of maintenance, which is much less in electric than in the fuel-fired furnaces. He cited one case where a continuous carbonizing furnace in an automobile plant had the same fuel cost as an electric furnace, but the labor saving in favor of the electric was 75 per cent. He pointed to the rotating hearth furnace as the most efficient one of the continuous type. Mr. Talley also devoted some time to the discussion of electric enameling furnaces which had been demonstrated in his opinion to be considerably cheaper than the fuel-fired furnaces.

Yale Professors Furnish Background

THE three addresses by members of the Yale faculty, delivered at the morning session, were presented by Prof. C. F. Scott, head of the department of electrical engineering, under whose auspices the conference was arranged; by W. B. Hall, assistant professor of electrical engineering, and by C. H. Mathewson, professor of metallurgy and also consulting engineer, New Jersey Zinc Co. and Bell Telephone Laboratories, New York.

Professor Scott took as his subject "Industrial Electric Heat." He dwelt upon the advances which electricity has brought about and the philosophy of the industry as a whole. The most interesting part of his address was a summary of the results of the adoption of electricity for heat treatment in ten installations in Connecticut and Massachusetts. These are the results of the survey of ten different companies by the Manufacturers' Association of Connecticut in cooperation with the electrical engineering department of Yale, and the details were issued as an appendix to Professor Scott's address. The details of the installation at each plant, the name of which is not given, furnish valuable information concerning the equipment, the former fuel used, the capacity installed, the benefits from the use of electric heat, and the overall cost.

The following table presents a summary of the results of the survey:

Table of Results of Adoption of Electricity for Heat Treatment in Ten Installations in Connecticut and Massachusetts

Installed Capacity 40 to 1530 Kw.; Average 540 Kw.

Plant No.	Processes	Return on Investment, Per Cent
1	Hardening of small tools	...
2	Hardening of small forgings	100
3	Annealing of small forgings	...
4	Annealing of sheet steel	...
5	Hardening of wrench jaws	100
6	Annealing of drop forgings	20
7	Carburizing	36
8	Annealing brass and copper tubing	50 to 75
9	Annealing nickel silver	25 to 50
10	Hardening steel rings	75 to 90

Result	Plant No. 1	2	3	4	5	6	7	8	9	10
Better temperature control	X	..	..	..	X	..	..	..	..	..
Increased production	X	X	X	X	X	..	X	..	..	X
Elimination of rejects	..	X	X	X	..	..	X	X	..	..
Uniformity in annealing	..	..	X	..	..	..	..	..	..	..
Uniformity in product	..	..	..	..	..	..	..	..	..	X
Lower labor cost	X	X	..	X	X	X	X	X	X	X
Cost of power and labor less than oil	..	..	X	..	..	..	..	..	..	..
Cost of electricity less than gas	..	X	..	..	X	..	..	X	..	..
Overall cost reduced	X	..	X	..	X	..	X	X	..	..
Lower maintenance cost	X	..	..	X	..	X	X	X	X	..
Less floor space	..	..	..	..	..	..	..	..	..	X
Reduction of inventory	..	..	X	..	..	X	..	..	..	..
Elimination of packing	..	..	..	..	..	X	..	..	..	..
Less time for tumbling	..	..	..	..	..	..	..	..	..	X
Less scale	..	..	..	..	..	..	..	X	X	X
Improved working conditions	X	..	..	..	X	..	..	..	..	..

An exposition of the difference in the conditions producing heat in an electric furnace, as compared with fuel-fired furnaces, was presented by Professor Hall when he spoke on the subject "How Electricity Heats and Its Control." Professor Mathewson, in discussing the subject, "From Guess to Science in Heat Treatment," told in general the elementary theory of

heat treatment on the basis that there are only two variables, temperature and composition, and that changes in structure can be obtained only by careful temperature control.

After the morning session a luncheon was served in the large Yale dining hall. The promoters of this conference are to be congratulated on its success and it is stated that others on different subjects are planned.

When Employees Assist Management

Loyal Labor Has Prevented Loss of Important Markets and May Often Provide Solution for Difficult Management Problems

THAT well organized industry is deriving increasingly important benefits from loyalty in its workers and is calling upon them freely in the solution of management problems was emphasized at a conference on employee representation held in Philadelphia on Dec. 1 and 2 by the American Management Association. Although the practice of allowing the employee to have a part in the settlement of management problems in which he is vitally interested has developed largely in the last ten years, some companies have already found labor willing to share the burdens of difficult conditions and thus prevent serious embarrassment in operation.

Preventing Loss of Export Market

A splendid example of this sort of employee loyalty in a nail and wire manufacturing subsidiary of a large Canadian steel company was outlined at the meeting. This company adopted employee representation in 1922 in an effort to reduce manufacturing costs and increase production in the period of post-war deflation. The plan was successful, but in 1925 the company faced the loss of its important export market in the British West Indies due to European competition. Conditions were rapidly becoming worse and when the company's sales agents in the territory asked to be released from their contracts drastic measures had to be taken.

Through its works council the company asked its employees to work without remuneration with the agreement that such profits as might be derived in the holding of the West Indies market should be divided on the basis of 75 per cent to employees and 25 per cent to the company. The workers voted in favor of the plan and as a result railroads and steamship companies handling the company's products agreed to reduce their rates. In this manner the market was maintained, and using the pre-war average as 100 per cent, export business to this territory thus far in 1927 has amounted to 307 per cent. Nor were the workers forced to take a serious loss in wages. In the last five months of 1925 following the introduction of the plan their wages on export work amounted to 84.9 per cent of normal. In 1926 they were 65.4 per cent, and thus far in the present year, 115.4 per cent. As only 23 per cent of the company's business is export the workers were never called upon to suffer a serious loss of remuneration, and are now actually receiving more wages than before. Yet the company was able to maintain an important market without serious loss.

Employee Representation in Small Plants

While employee representation has always been generally conceded to be of value in plants employing large numbers, its worth in the comparatively small plant has often been questioned. In a session devoted to this problem, a representative of a small subsidiary plant of a large steel corporation outlined the features of the plan in force in his organization. Here one representative for each group of 50 employees is elected to the works council and unusually satisfactory results have been obtained. In the opinion of this representative the argument that employee representation is unnecessary in a small plant because contact between men and management is possible without it is unfounded. For that company employee representation is not designed for contact but for cooperation.

Other successful plans in small and medium-sized units were outlined and discussion led to the conviction that employee representation may be introduced successfully into a plant of nearly any size, providing the workmen desire it and a proper amount of interest is maintained.

Plan Must Not Be Forced Upon Workers

The danger of attempting to introduce employee representation into a plant where the workers have not been educated to its advantages was stressed by a professor of economics in a small Ohio college. In discussing the accomplishments and significance of employee representation, he stated that such plans have really accomplished nothing which would not have been achieved by well organized and well managed trade unions. The unions, however, have failed in many instances through the use of improper methods, and managers well trained in industrial relations are now competing with unions in the leadership of industry. The success of the former will be due to employee representation plans which make industrial citizens out of laborers rather than mere commodities in industry.

Defining Employee Representation

Confusion as to the what and why of employee representation was largely cleared up at the opening session of the meeting in a talk by an executive of a large telephone company. Employee representation, he pointed out, is not management sharing, for the large present day corporation must be managed by a selected group who have been trained in its problems in order to be successful. Nor is it leading to industrial democracy. Such a condition would deprive management of its authority and lead to ruin. It might, however, be termed as democracy in industry. Nor is employee representation a form of labor organization. Such a plan might be successful in an organized plant, but if it takes the form of organized labor it falls short of the original purpose. The essential purpose of employee representation is to improve the relations between management and the workers of a plant.

The speaker defined employee representation as a new form of organization to provide for the betterment of a given industry by recognizing that the old form of management's treatment of labor is unsuited to present conditions, that the workers are entitled to a better status in industry, that the laborer should have a right to be a part of an organization rather than a commodity, that the worker has a right to confer with the management and know what is going on in the industry, and that where size prevents contact between the employer and the employee the general forces should have this contact through representation.

When Employee Representatives Should Be Elected

Terms of service of employee representatives were discussed in a symposium on the subject, which was based on a questionnaire sent out to a number of companies having successful plans. It was found that 25 of the companies replying to the questionnaire elected their representatives at annual elections to serve for one year, that 16 elected twice a year for one-year terms, with half of the representatives retiring at each election, and that 7 firms elected their men for two-year terms, half of them retiring yearly. Some companies held elections as often as every two months, two men being elected at each election, but all serving for a year. There were other unusual arrangements, but it was generally agreed that the employee should

serve at least a year in order to become fully acquainted with procedure at the meetings and be of real value to the council.

On the other hand some companies contended that a two-year term was necessary for complete education in the ways of the business. Supporters of the one-year term, however, maintained that this did not allow enough of the workers an opportunity to serve on the council or committee, and it was also difficult to make changes if the member elected proved incompetent. In most cases employee representatives are entitled to reelection, and this arrangement nearly always provides for a return to the council of members who have been particularly valuable in their first term. It also prevents the embarrassment which might arise if an entirely new group of persons were elected to the committee who were not familiar with the procedure of the meetings.

Plant and Equipment Maintenance

Organization and Methods Discussed at A. S. M. E. Shop Practice Meeting—Close Attention Given to Lubrication

PLANT and equipment maintenance practices of several companies in the metal working field were outlined at a symposium on shop-equipment maintenance, held under the auspices of the machine shop practice division of the American Society of Mechanical Engineers, Dec. 6, during the week of the society's annual meeting.

At the plant of the National Cash Register Co., Dayton, Ohio, maintenance work is divided into three classes: General factory maintenance, tool maintenance and machine-equipment maintenance. The latter, the machine maintenance work, was outlined in a paper by W. Hartman of the National company.

The machine maintenance work is divided between four departments. The general machine department repairs and rebuilds all machines and takes care of all general machine shop jobbing work. The electrical department inspects and repairs all motors, wiring connections, etc., and the millwright department installs, inspects and repairs overhead works and belting. This department also moves all machinery. The fourth department is the purchasing, which cooperates with the other three in securing replacement parts, furnishing prices on new equipment, etc.

In this plant no one department is responsible for the condition of machinery. Each production foreman is held accountable for keeping his machinery in first-class condition. Punch presses and certain other machinery are inspected regularly once a month. Screw machines, mills, drill presses, lathes, etc., are constantly being watched by everyone who comes in contact with them. Their work is transferred to other machines of the same type while they are out of service because of needed repairs. A comparatively large number of screw machine replacement parts is carried in stock, the particular parts and quantities carried having been determined by past experience.

When machines are sent to the general machine department for repairs due to wear they are inspected for the cause of wear, and the weakness remedied and errors due to wear corrected. It was said that experience has shown that if this is not done the same machine may be back for repairs in a short time. When it is found that the cost of repair is excessive, the production foreman or general machine department foreman recommends to his supervisor that the machine be replaced by a new one.

The plant has an annual two weeks' vacation, which period is utilized for thorough inspection of all machines which run continuously. Parts showing wear are then replaced. At some time before this vacation a survey is made of all departments and a list is made of machines which are known to need repairs. This, it was pointed out, enables the machinists to do considerable preliminary work.

Regular Oiling Important

It was pointed out that one of the least expensive things that can be used in a machine shop is oil. A new man or an old one being placed on a new machine is given thorough instruction in oiling, and his machine is inspected by the job foreman at intervals for a few weeks to see that the oiling has been properly done. Extra large oil cups are provided, and where practical automatic oilers are installed. It has been the experience of the company that instead of neglecting to oil, there is a tendency to use too much oil. In a few departments, where different machines may be used by several men and where work is of a very accurate nature, an experienced man devotes his entire time to the oiling of machines.

Machine Tools and Appliances the Largest Division of Maintenance Work

Plant maintenance as a function distinct and separate from regular production work was dealt with in a paper by G. H. Ashman, General Electric Co., Schenectady, N. Y.

The plant maintenance department may be divided into three separate branches: Civil, mechanical and electrical engineering, said Mr. Ashman. The first of these has charge of building, the second of machinery, and the third of power. The largest division is that in charge of machine tools and appliances. A number of interests center here, such as the selection and purchase of new tools and their installation; the attaching of motors, control and wiring; the repair, discarding and scrapping of old machines; and the purchase of small tools and attachments. The general superintendent of the plant has entire charge of this important phase of the work.

When a new machine has been purchased, the foundations are built by the grounds-and-building department and the machine set in position by the millwrights. The motor and control are next installed, and the machine is wired by a special department controlled by the electrical superintendent. Before the machine is placed in production it must be inspected and approved by a representative of the safety committee for gear guards, etc.

The machine is given a catalog number by which it is identified throughout its life. This number is not reissued when the tool is scrapped or otherwise disposed of, but remains as a perpetual record to identify it.

Separate Accounts Kept for Each New Tool

A separate account, kept in card-index form, is opened for each tool as it is received and installed. Besides accounting information, there is given a general description, the capacity and purpose of the tool, feeds, speeds, maximum and minimum travel of essential working parts, and all special fixtures and attachments. The price of the bare machine appears as a separate item, all attachments, special fixtures, motors and control, etc., having their prices entered as extras. On the face of the card are given the catalog number of the tool, date of purchase, name of manufacturer, and selling agent, if any, and its location in the plant. On the reverse side are noted all repairs or alterations made, including nature, date and cost of repairs, etc. This information was said to be of value in determining whether there is inherent weakness in the design of the machine, shown by the breaking of the same part several times. If the tool is not suitable for the work, frequent repairs will be necessary. The record also indicates the extent of the abuse or lack of proper care which a machine receives.

Every year a new depreciated value is entered on

the record card, the rate of depreciation being governed by the class of tool (whether lathe, planer, drill, punch press, etc.); by location in the shop (toolroom lathes have a lower depreciation than production lathes, etc.); by size (small lathes are given a higher rate of depreciation than large ones); by obsolescence (change of methods of manufacture being more likely to affect certain classes of special tools than others).

Automatic Oiling Used Wherever Possible

The foreman of the department in which the machine is installed is responsible for its mechanical operation and upkeep, and for the instruction of the operator in its use. Particular attention is paid to lubrication; an automatic oiling system operating from a central tank on each tool is installed wherever possible, eliminating individual oil cups. Instructions are issued indicating the proper grade of lubricant for each service, and attention is called to parts requiring grease lubrication under pressure. The care of belting is attended to by an expert gang in each department.

Repairs are undertaken at the direction of the foreman, with the approval of the superintendent or general foreman of the department where the machine is located. Minor repairs or emergency breakdowns are taken care of by the tool-repair gang of the department. Major repairs are made in a separate department. Repairs of this nature are only undertaken after a close estimate of the cost shows a good margin below the cost of a new tool. The depreciation value of the tool and obsolescence are factors in the decision for or against repairs.

Chucks, collets, taper attachments, etc., as well as milling cutters, drills, arbors, grinding wheels, etc., and hand tools are handled by a central and separate small tool department. Data are kept concerning their life and fitness, and future requirements filled from those showing best results.

Cutting tools for lathes, planers, etc., are supplied by the small tool department, which selects the proper tool steel, forges or constructs the cutters and grinds them for service. Subsequent grinding or sharpening is done by the toolroom of the section operating the machine. The small tool department is also responsible for gages, and makes weekly inspection of gages.

Transportation, die, pattern and jig work, power, heat and light, and safety departments were also dealt with in Mr. Ashman's paper.

Other papers at this session included: "Plant Maintenance and Return on Capital Investment," by W. H. Chapman, Harrison, N. J.; "Maintenance of Shop Equipment," by J. R. Weaver, assistant superintendent, equipment department, Westinghouse Electric & Mfg. Co., East Pittsburgh; and "Maintenance of Shop Equipment," by C. S. Gotwals, time study department, Hess-Bright Mfg. Co., Philadelphia.

Guarding the Health of Employees

How Smaller Plants Can Obtain Medical Attention and the Service of a Nurse Through Local Tuberculosis or Public Health Association

BY HELENA L. WILLIAMS*

HEALTH work for the benefit of employees of large industrial plants and offices is nowadays as much a part of routine management as the inspection of machinery. The owners of many smaller factories, however, are still unable to establish a satisfactory health service for their employees, because physicians, nurses, hospital beds and clinic equipment are too costly. On the other hand, the workers are more likely to remain in employment where a health service is assured.

To such establishments, the increasing attention given to industrial health by volunteer health agencies, notably the tuberculosis associations, is a boon. One of the main planks in the anti-tuberculosis platform is to prevent physical breakdown and to discover early, curable cases. Moreover, the preventive measures employed in this work check up the condition of the entire body and help to build up resistance against other illnesses.

These agencies, which are active in all parts of the country, are prepared to cooperate with employers. For the benefit of small plants one association has, for example, organized local factories into units for cooperative medical service. Each unit is composed of plants employing from 25 to 500 workers, a total of 1000 workers per unit. For this group, one full-time nurse and a part-time physician are engaged. Each plant in the unit provides a first aid or clinic room in its own establishment and pays a quarterly pro rata share of the maintenance of the unit, based on the number of employees. During 1926 $4.50 per employee per year was determined upon as a preliminary cost figure. The health service provided is as follows:

(1) Physical examinations, including: (a) Examination of all applicants for work before or shortly after employment; (b) the re-examination, at intervals, of employees having physical defects; (c) the annual examination of employees.

(2) Medical and surgical relief, including: (a) Emergency treatment of accidents and minor illnesses occurring at the plants and follow-up of compensable cases; (b) advice as to the correction of defects found upon examination; (c) follow-up of absentees by the nurse; (d) cooperation with the family physician of sick or injured employees.

(3) Instruction in first aid to sick and injured is given to individuals or groups in each plant.

(4) Industrial hygiene and sanitation, including: (a) Sanitary survey of plant; (b) sanitary supervision of plant with regular inspection; (c) health education and hygienic instruction to employees by talks, posters and leaflets.

Regular visits are made every week to each plant by the physician and the nurse, whose time in each place is determined by the number of employees. No less than 3 hr. of health work each week per 100 employees is provided. Complete records of all the work that is done are kept by the nurse at the plant.

The Louisville Tuberculosis Association of Louisville, Ky., has worked out a simple plan for gaining the worker's confidence. A letter is sent to his home address offering a free medical examination. With it is inclosed a blank form to be filled out and returned to the organization if the examination is desired. The letter reads in part as follows:

My dear Sir:

How do you feel? How's your health? If you want to find out if you're in tip top shape or not, here's your chance to get a first class health examination free, right in your own shop.

We are trying to help people learn how to keep well. That's our job. Our examinations are free because we are supported by the Community Chest. If you are examined you will not, now or at any time, be under any obligation to any one. Remember: A "stitch in time" may prevent unnecessary sickness. A health examination means that a doctor tests out your body just as an expert mechanic tests a machine. This is what he gives you: Eye test; nose and throat examination; mouth and teeth examination; blood pressure test; heart test; muscle control test; weight and height measurement, examination of feet for fallen arches. Important! The result of the examination will be known only to you, the clinic physician and the clinic nurse in the employ of the Industrial Health Service.

Employers who are bothered with absenteeism and labor turnover are likely to find an efficacious and economical remedy through cooperation in the industrial health programs of their local tuberculosis or public health association. This special phase of the anti-tuberculosis campaign is steadily increasing along lines satisfying not only to the worker but to the business man. A large part of the funds realized through the annual sale of the Christmas seals is used for this purpose.

*National Tuberculosis Association, 370 Seventh Avenue, New York.

Moves Works in Thirty Days

Philadelphia Gear Works Now in Plant Laid Out Along Pre-Studied Lines and Allowing for Expansion

FACED by the fact that there was no room for expansion in the old plant on Tioga Street near Richmond Avenue, the Philadelphia Gear Works has moved into a new plant on G Street near Erie Avenue and abutting on the main line of the Pennsylvania Railroad, near North Philadelphia. The property acquired covers about 8½ acres, running from the railroad to Erie Avenue and from G Street to F Street.

One building with a lean-to annex houses the entire plant at present. The building is 400 ft. long and 111 ft. wide, being about 100 ft. longer than the old building just abandoned. The lean-to, which is on the north side, is 21 x 216 ft. A spur from the railroad comes in on the west end at an angle, there being space enough on the track inside the building to accommodate one full-length box car.

Building in Four Long Bays

Most of the main building is two stories in height, with three 22-ft. bays running the length of the plant. A fourth bay, on the north side, was made 43 ft. wide, to accommodate three overhead traveling cranes. This bay runs up through the two stories and contains the heaviest tools. The lean-to is divided into five compartments alternately 36 and 54 ft. long, and devoted respectively to a transformer room, locker and wash room, boiler room (for heating only), heat-treating room and toilets.

More than 245 machine tools, including lathes, drill presses, shapers, millers, hobbers, gear generators, grinders, power saws, keyseaters, boring mills, etc., are located on the main floor of the plant, which is of concrete. The general construction of the building above this floor consists of a structural steel frame with heavy timber flooring and brick walls. It is thus typically a factory construction or "slow burning" type, and is equipped with automatic sprinklers. The window area is considerable, making artificial illumination unnecessary for most of the day and for a great portion of the area.

On the upper floor, which occupies a width of 66 ft., the office extends for 72 ft. at the east end. The remaining space is open and serves successively as a storeroom for finished gears, pattern storage and pattern shop, the latter being at the west end.

Layout of the Machinery

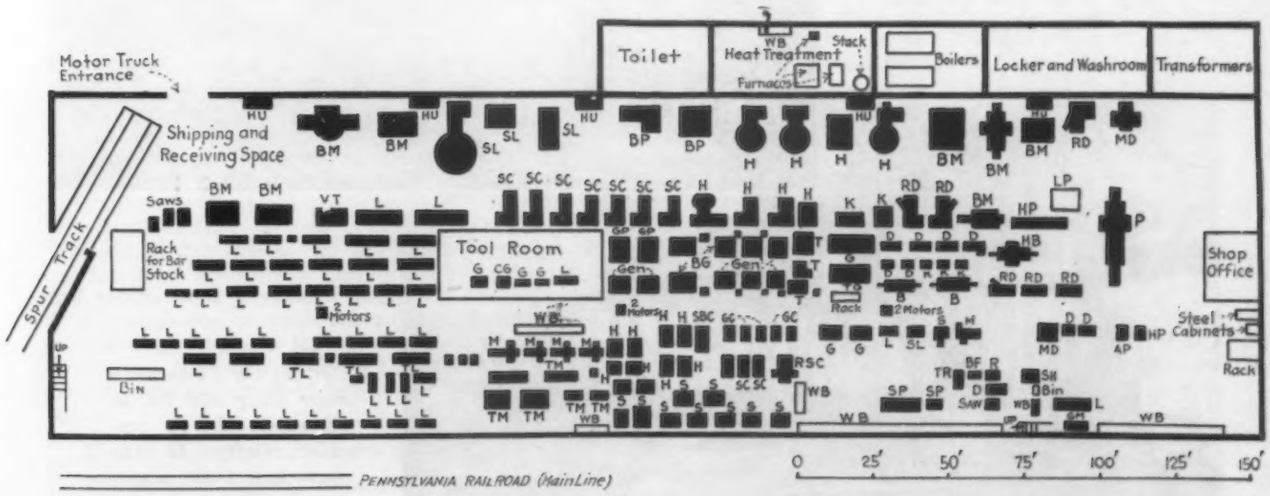
In the layout of the lower floor, the lathe department occupies the west end of the three narrow bays, with the gear-cutting department and the tool room in the center. At the east end are the finishing and assembly departments, while the heavy machines are all in the wide bay served by the three cranes. These latter, of 5, 10 and 15 tons, are some 5 ft. higher than in the old building. They can handle heavy pieces to the second floor, as the platform projects far enough under the craneway to accommodate large boxes, etc. The shipping department at the west end of the wide bay is also the receiving station for incoming castings, as the company does not operate a foundry.

In the heat-treating department, through which practically 99 per cent of the steel gears pass, equipment is at hand for carbonizing, normalizing, etc. One furnace provided by the Surface Combustion Co., New York, and one from the American Gas Furnace Co., Philadelphia, are used for heating. Gas is the fuel, a blower being used. Control of temperature is assisted by a Thwing pyrometer with a switch, permitting it to be used in connection with either furnace at will.

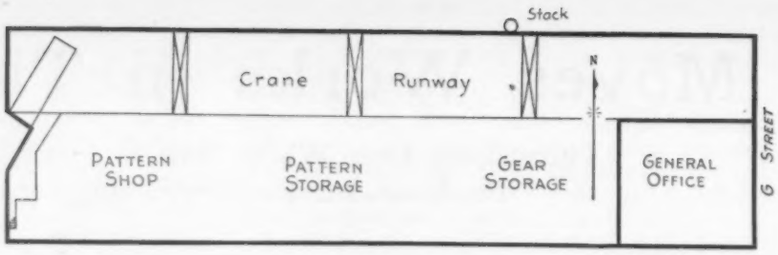
All the heavy machines along the north wall of the wide bay have separate motor drives. Two large lathes on the south side of that bay also have individual motors. Otherwise all the machines in the plant are driven from jack-shafts. These are actuated by six motors suspended on platforms from the second floor beams, and rated at 40 and 25 hp.

How the Move Was Made

Moving of machinery was started on Aug. 15, the transfer to the new building being carried out by departments. In 30 days production was practically full at the new location. The lathe department was



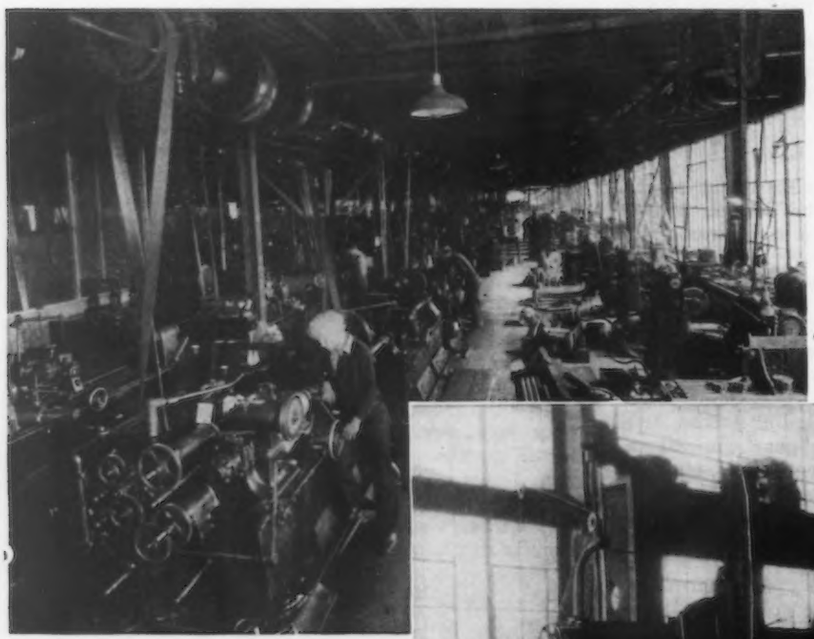
Layout of the Main Floor of the New Plant of the Philadelphia Gear Works. Symbols designate tools and equipment as follows: AP, arbor press; B, broach; BF, buffer; BG, bevel generator; BM, boring mill; BP, bevel planer; CG, cutter grinder; D, drill press; G, grinder; GC, gear cutter; Gen., generator; GM, grooving machine; GP, gear planer; H, hobber; HB, hob boring mill; HP, hydraulic press; HU, heating unit; K, keyseater; L, lathe; LP, layout plate; M, milling machine; MD, multiple drill; P, planer; R, riveter; RD, radial drill; RSC, rack and spur cutter; S, shaper; SBC, spur and bevel cutter; SC, spur cutter; SH, shear; SL, slotter; SP, straightening press; T, tester; TG, thread grinder; TM, thread miller; TR, tooth rounder; WB, workbench



Second Floor of the Gear Plant. Only the lower (southern) portion has a second floor and that is entirely open (except for the office) both in itself and with regard to crane-way in northern bay

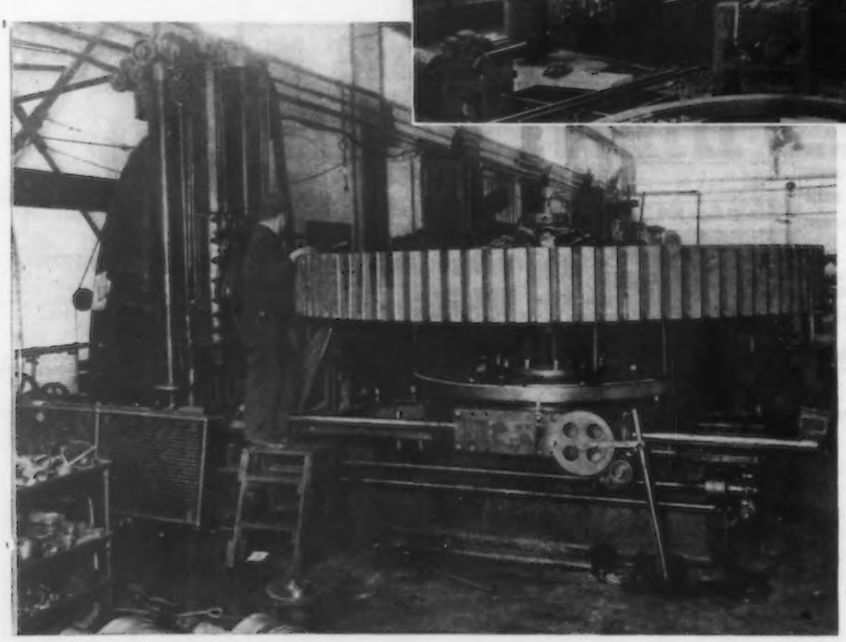
moved and at work within four days. Motor trucks were used, under contract, for the entire movement of machinery, while certain stock items, raw materials, etc., went by railroad.

Future expansion is possible both to the north and to the west. The first such move will naturally be westward, increasing the length of the present shop along the railroad. Eventually this may bring the railroad spur and shipping section—now at the west end of the building—into the center of a greatly extended plant. Considerations of light, etc., may make any later northward extension take the form of a building separated from the present structure, probably, by a wide court.



Turning a Herringbone Gear Blank on a Large Boring Mill in the Crane-Served Bay (Below). The excellent natural lighting, which here is from the north, will be noted

Small Gear Cutting Department in the South Bay, Under the Pattern Shop (Above)



Cutting the Teeth on a Spur Gear 156 In. in Diameter. This machine (left), in the north bay of the plant, is under the crane runway

Factors of Human Engineering*

Development of Employee Relations Traced with Regard to Effect on Industry and on the Body Politic

BY CHARLES M. SCHWAB

OF all the arts and crafts and professions to which men devote their energy and their talents, none more profoundly affects the destiny of the human race than engineering. From the Pyramids of Egypt to the Panama Canal and present-day achievements in conquering time and space, the profession of the engineer has played a dominant part in the lives of men and nations. It has chosen the ablest, the most daring and the most energetic of men, has inspired them with the desire for achievement, and has then exacted their utmost of devotion and service. It is but natural that the result has been measured in better and higher standards for society. Wherever engineering has excelled, there we find the highest order of life.

In their progress during the last half century, engineering and industry have marched side by side. Their development is a remarkable story of scientific achievement. The mobilization of capital and engineering talent has made possible the large-scale industry that is the leading characteristic of the wonderful era of progress in which we live.

Conflicts in Industry Ruinous to All Parties

Forward-looking management, as well as far-sighted representatives of employees, are coming to realize that, if full benefits are to be had from the creations of engineers, industry must be viewed as a cooperative undertaking, in the advancement of which every supervisor and every employee is an important factor. They recognize that conflict between capital and labor is destructive of the interests of each; that it is unnecessary and is expensive to both.

Expert service in enlisting the interest and confidence and good-will of the workers becomes just as important as the study given to the characteristics and utilization of materials. Out of its solution comes a new code of economics, a code which aims not only to provide food and clothing and shelter, but also to elevate society at large and to place a true dignity upon labor, a dignity that yields a fuller and happier measure of life. It is highly fitting that we in America have led the way to better industrial relations, for indeed there is being brought forward a truer realization of the principles set forth in that great document signed at the inception of our nation, enunciating the doctrine that among the unalienable rights of men are life, liberty and the pursuit of happiness.

What are these reasonable wants of employees, which they have a right to see satisfied as far as conditions of industry permit? I believe they include the payment of fair wages for efficient services; steady, uninterrupted employment; safe-guarding of their lives and health, good physical working conditions; a voice in the regulation of conditions under which they work; provision for them to lay up savings and to become partners in the business through stock ownership; and finally, some guarantee of financial independence in old age.

Modern Management and the Question of Wages

The desire of labor in connection with wages can, I believe, best be fulfilled by rewarding men in accordance with their contributions toward the success of the business. It is fundamental with human beings that they want individual recognition of and reward for their talents and achievements. This is the crux of the wage problem. The nearer we can come to fulfilling this want on a sound, justifiable basis which recognizes individual merit, the sooner shall we witness the solving of a long-standing and contentious question.

High wages do no good to the man who has no chance to earn them. Hourly and daily rates mean little to the employee who can work only a few days a month or a few months out of the year. Steady employment, therefore, ranks high among the needs of the workman. It has come to be realized that peaks and valleys of industrial activity, during which periods of feverish effort to get out products alternate with periods of idleness and stagnation, not only are undesirable from the standpoint of the working man but are wasteful and expensive to industry and to society as a whole.

Financial Interest in the Business

But, even with good wages and steady employment, the working man is likely to lack one factor essential to his fullest efficiency and greatest interest in the company by which he is employed. This factor is ownership. A sense of proprietorship affords a powerful incentive to arouse interest in the performance of work. This principle has been the motivating influence of those who have been willing to take the risk incident to the building of all business. Its application to the wage earner in industry is relatively new, yet nowhere is the wholehearted interest of human beings so necessary and vital to successful accomplishment. Recent years have seen a considerable growth in stock ownership by industrial employees.

Successful human relations in industry recognize that the interests of employees and employers are mutual. The very nature of their aim for profit creates an interest in one another's well-being.

It is true that, just as in any human relationships, there are day-by-day problems arising in industrial relations which, if not settled with full justice to each, will threaten this bond of friendship. But the need for a medium for preventing or adjusting breaches in relations is not the whole objective. Essentially the two parties have been seeking a medium which would provide a common meeting ground. They have really been seeking for a way of living together which would permit an expression of their personality, and yet cement and increase this friendship. The employee-representation movement is such a constructive medium, permitting not only settlement of questions on which there is a conflict of interest, but, of even more importance, offering an unobstructed channel through which their unity of interest may be promoted.

Safeguarding Life and Health

With high wages, steady employment, a financial interest in the business, and a means of contact and cooperation with the management through representatives of his own choosing, the wage-earner has perhaps secured the fulfilment of the most important and vital of his desires. There are other factors in industrial relations, however, which should by no means be overlooked. One of these concerns the safety of work and the provision made for the employee in the event of sickness or accident. For indeed both sickness and accident affect both wages and stability of employment.

Advances made in industrial safety work since the beginning of the century have been noteworthy and reflect credit alike upon management and men, for essentially it has been a cooperative movement. Much of this advancement has been due directly to the efforts of the larger industrial corporations. One of the

*From the presidential address at the annual meeting at New York, Dec. 6, of the American Society of Mechanical Engineers.

things for which the world will long remember the late Judge Gary was his continued and successful effort to improve safety conditions.

One of the most difficult problems, not only in industry but in society as a whole, is the maintenance of those who, on account of old age, are no longer able to support themselves. Many industrial companies are seeking to provide for their aged employees through various types of pensions. To meet the economic needs of the aged worker, however, is not the only aim of a pension plan. It also provides a highly fitting basis for rewarding those faithful workers who have given their best years in the service of the company.

Aid Toward Home Ownership

The present tendency of workers to invest in the purchase of what are regarded by some as luxuries is sometimes viewed with concern. On the whole I believe this tendency is but a step in the march of progress to a higher standard of life—a fulfilment of the new code of economics under which the luxuries of yesterday are becoming the necessities of today. Fundamentally the whole trend is based upon the better economic position of the worker, helping to place these conveniences within the reach of all.

In the desire for home-ownership, which ranks high among the ambitions of the average workman, there is generally need for financial assistance. We believe that any help we can render our employees to help them realize this desirable ambition not only makes for better standards for them, but makes for a better community as well. Our aid in this housing program takes the form mainly of guaranteeing or purchasing the second mortgage on the property.

Effects Upon the Stability of Business

But I must go beyond merely the benefits to employers and employees, important as these benefits are, if I am to justify my statement that the money spent upon human engineering is an investment in national well-being. Let us turn then briefly to some of the advantages which have accrued to the nation and to society at large.

To start with one of the most obvious, I believe that the present stability of business is due largely to the better relations that have been brought about between employers and employees. Not so many years ago buyers of basic products were under a constant fear that their supplies of essential materials would be interrupted by strikes, lock-outs, or other overt expressions of industrial ill-will. They could not be sure of uninterrupted production. Therefore, they bought beyond their needs and laid up surplus supplies which, in periods of business recession, were dumped on the markets.

Today this situation has changed. Only in a few industries, having special problems of their own, is there at any time serious danger of suspension. Buyers realize that they are no longer the victims of conflict and misunderstanding between management and labor. The confidence which they have come to have in the ability of industry to supply continuously and uninterruptedly has revolutionized purchasing methods.

Sustained Employment and Purchasing Power

With this greater stability of business has come more regularity of employment. Until recent years, a large amount of unemployment was considered natural and inevitable. It might be caused by stagnation resulting from the down-turn of the business curve or it might be voluntary idleness due to strikes.

However diverse may have been the causes of unemployment, there was no doubt as to its harmful results, not only upon the workman and his family but upon business and society. Injury to business and society became constantly greater in the measure that industry came to depend upon the purchasing power of the wage earner for a large portion of its market. It is apparent today that no section of our population can remain idle over a protracted period—whether involuntarily as a result of business decline or voluntarily as a result of industrial misunderstanding—without this situation affecting the whole economic structure of our nation.

Industrial Preparedness Urged

Procurement Planning Hampered by Shortage of Both Personnel and Funds—Large Stock of Manganese Ore Recommended

WASHINGTON, Dec. 6.—That industrial preparedness may be planned intelligently there must be a definite determination of the war-time munition needs under a general mobilization plan approved by the President and supported by Congress, says Assistant Secretary of War Hanford MacNider in his annual report. There must also be furnished adequate funds for securing and keeping up-to-date detailed information as to the industrial development of the country, for making plans for the efficient utilization of its industrial strength in war, for training personnel in the duties of procurement and procurement planning and for purchasing and keeping in reserve a supply of gages, tools, finished articles, and special raw materials sufficient to meet the approved war-time need until the industry of the country can reach a sufficiently high production basis.

Pointing out that a determination of war-time needs and the measures to be taken to meet them involves a careful consideration of the plans of the Navy Department as well as those of the Assistant Secretary of War and the General Staff of the Army, Mr. MacNider recommends that the President be requested to appoint a board to determine the war-time munition needs and to prepare a project for placing the Army in such a state of material preparedness that the War Department may be able to make adequate plans for meeting these needs.

Assistant Secretary MacNider states that there are acute shortages of personnel engaged on procurement planning in the Ordnance Department and Air Corps. He recommends that the Ordnance Department be increased by 60 officers and the Air Corps by 50 officers. He suggests that the increase be spread over a period of five years and be made up of recent graduates of West Point or the better technical schools, or by transfer from other branches of the Army, after proper training in procurement duties.

He also says that funds for replacement of war reserves have been inadequate to maintain stocks at the proper levels, and asks for more funds. In addition to the finished products required, a reserve of 600,000 tons of ferro-grade manganese ore is recommended. In building up war reserves of finished articles, the report says, educational orders should be used. It is recommended that serious effort be made to have a law passed by Congress amending the national defense act so as to remove the present provision, which restricts the manufacture of supplies to Government arsenals and factories unless they can be produced on a more economical basis elsewhere.

The report acknowledges the valuable assistance received from the industries of the country in connection with the War Department's program of industrial preparedness.

"Without their cooperation our schemes would be merely academic studies, instead of definite plans whereby several million workers can promptly begin the production of war material," it is declared. "The extent and character of the aid that has been given is amazing. Assistance has been received from those men who carried through our industrial effort during the World War, leaders in various fields of industry, from owners, managers, and planning staffs of many thousands of manufacturing establishments, from national technical societies and business associations, and individuals."

For Closer Cooperation in Design

Foundry, Pattern Shop and Machine Shop Should Be Consulted by Designing Engineers—Much Saving Might Be Accomplished

CLOSER relationship between the designing engineer on the one hand, and the pattern shop, foundry and machine shop on the other, was urged in a paper by E. H. Ballard, general foundry and pattern shop superintendent, General Electric Co., Lynn, Mass., before a joint meeting Nov. 30 at the Downtown Club, Newark, N. J., of the Newark Foundrymen's Association and the Materials Handling Division of the American Society of Mechanical Engineers. This meeting, which was presided over by Samuel H. Libby, consulting hoist engineer of the General Electric Co., was preceded by dinner. The attendance was reported at 112. Following Mr. Ballard's paper was one by R. T. Turner, sales promotion manager Shepard Electric Crane & Hoist Co., Montour Falls, N. Y. This was largely a running comment upon a series of lantern slides, followed by two moving picture reels.

Cooperation in Design

CASTINGS often represent the largest labor item and the largest expense item in the production of a machine. For this reason, Mr. Ballard said, they deserve to receive good design. Lack of coordination among those responsible for bringing out the product results often in complicated castings and in poor final results. Changes frequently are needed before a satisfactory manufacturing procedure can be attained.

For this reason it is not only advisable, but almost imperative, for the designing engineer to call the foundryman into consultation during the early stages of the design. It is extremely desirable also that a full scale drawing be made of each such part which the foundryman is called upon to examine. Usually the foundryman is not skilled in the interpretation of scale drawings and the full size would be of great benefit in obtaining his judgment. For the same reason the pattern maker should be called in, so that there may be no hitch in obtaining satisfactory patterns for the foundryman's use. The machine shop foreman frequently can offer suggestions which would result in a lower machining cost, if he has this opportunity before the design has been crystallized into its final form.

Examples of Better Practice

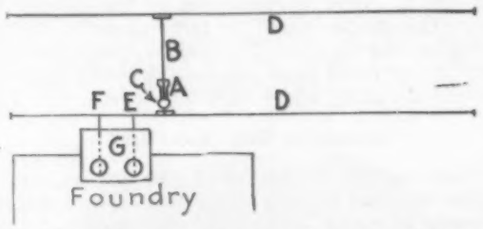
For some years it has been the practice in the foundries at Lynn to make a photographic record of the gates, sinkheads, etc., on important castings. This is done particularly if the castings are to be repeated in considerable numbers. As a result of this practice, it has been found possible to design and lay out the foundry work in such way that good practice on gates and sinkheads has become almost universal. The proper sizes are known from the records, which are dimensioned, and the cost of keeping up this system has more than justified itself.

Machining of the cope side of the casting first was recommended by the speaker, because that is the side of the mold most liable to damage. By the same token, it is the side of the casting most liable to show defects. For this reason the cope side in the Lynn foundries is marked in such a way that the machine shop can always tell which it is. Frequently observance of this practice results in either saving a casting which has small defects on that side, through the possibility of cutting deeper there and making a lighter cut on the other side, or, on the other hand, disclosing a serious defect at the earliest stage of the machining process, and thus avoiding putting a considerable amount of labor into a piece which later has to be discarded.

It is not uncommon for the designer to specify fillets which have an insufficient radius. The speaker reported seeing a molder deliberately make a larger fillet where he thought it necessary, after the pattern had been drawn from the mold. This practice should be discouraged, as a fillet of generous radius ought to be provided in the design. Molding machines have put a certain limitation on the design of castings, by making it very desirable to avoid lugs and projections as much as possible. Jigs and fixtures should always be made to allow for a reasonable variation within a certain specified tolerance.

Modern Equipment and Cost-Finding Essential

Scrapping of obsolescent pattern-making equipment and old style molding machines is a necessary procedure in up-to-date work. It sometimes is hard to



In This Diagram Showing Use of a Cupola Charging Machine on the Yard Runway, A Is the Machine, on Girder Crane B and Carrying Bucket or Magnet C. It operates on runway DD and, when B is spotted at E or F, may run right into the cupola house G and charge the cupola in its path

justify this in terms which the management will appreciate, but it is none the less imperative if the best work is to be done.

Cost accounting by groups of castings is a worthwhile procedure for obtaining averages as a check on estimates. However, each individual casting should be subjected to cost analysis separately, particularly if it is considerably different in its coring or other specifications. Only in this manner does it become possible to put a proper cost upon future work.

Conveying of castings to the machine shop is an important item in the economy of the plant as a whole. By making proper provision for this, the company has a consolidated movement of materials which takes the form of a merging of operations and much lost time, as well as expense, may easily be saved.

Mechanical Handling in Foundries

IN these days of keen and ever keener competition, it is important that a job be done with fewer moves, over shorter distances and with a smaller number of men. This was the keynote of Mr. Turner's paper on handling devices. He confined himself almost entirely to overhead handling, with only casual reference to electric lift trucks as feeders for the overhead units. His talk was almost entirely a running commentary on his screen illustrations. Each type was briefly described as shown and some of the particulars given as to what it had accomplished. Among the instances were one case where nine men had been replaced by one man operating the overhead equipment, and another where one man with this equipment was unloading 350 tons of metal in an 8-hr. day.

Starting with the simplest form of overhead hand-

ling, consisting of pneumatic or electric hoists on fixed I-beams, the speaker ran through the gradual developments of this system, such as an I-beam crane with the floor-operated hoist and then the regular overhead traveling cranes covering every square inch of the floor. He showed numerous instances and variations in all of these types and indicated why one or the other was chosen for its particular use. Overhead tramrail systems were shown, and were referred to particularly as to flexibility, because of the short-radius curves possible and the easy switching arrangement from one rail to the next.

Transfer Crane Charger

One feature brought out prominently in several pictures, both of the still type and of the moving type, was a transfer crane on the I-beam order, with a span of some 60 ft. and spanning the raw material yard. The trolley and bucket or magnet system, operating on this I-beam, was at the same time the cupola charging device. In the instance shown it performed this operation for two cupolas. The I-beam crane girder was brought into line with the suspended beam tracks leading into the cupola building, one after the other, as required. Being locked in position, a continuous track was formed whereby the charger could run from any point on the transfer crane directly into the cupola with its charge.

This installation was one in which the melt was about 20 tons a day. The two cupolas were lined down to an inside diameter of 37 in. Drop-bottom boxes were used, 28 in. in diameter and 36 in. deep. These were loaded on the ground underneath the transfer crane girder. They were hoisted by the charger and run into the cupola, where the tripping device released the bottom and dropped the charge, which was completely proportioned as to pig iron, coke and limestone, together with scrap where such was used.

Discussion Gets Into Costs

In opening the discussion on the two papers, the chairman referred to the change in conditions whereby the former inspection of castings with the aid of a 2-ft. rule had been supplanted by an inspection based on tolerances of a few thousandths of an inch. Even with this close work foundrymen have been able, under modern conditions, to turn out a product with very few rejections.

One speaker after another brought up the subject of costs, and particularly that of making a proper cost analysis on a standardized basis before a bid on a job is made. Mr. Ballard cited an instance in which members of the New England Foundrymen's Association had been asked to estimate the weight and then the price on castings from a definite blueprint. Various estimates of the weight differed by as much as 30 per cent, while the cost figures varied over a range of 50 per cent. Similar divergences in calculations were reported by others, one man telling of a similar set of estimates in which the final cost range was from 4c. to 18c. a lb. for the same casting. He stated, however, that members of the Newark Foundrymen's Association, who had adopted the standard cost system which has been worked out in that association, varied only ¼c. in this particular instance. The great differences were in the estimates of outside foundries.

Greater backbone in maintaining proper prices was pleaded for by several speakers. They paid their compliments to the smart purchasing agent who beats down prices and urged that business be not taken unless it could be had at a price which would yield at least some profit.

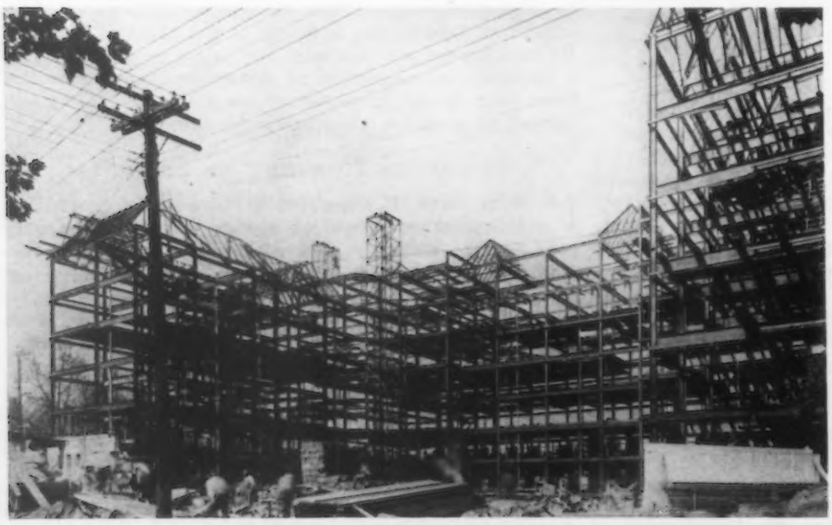
Engineering Education

Before the two papers were read, Professor Brooks of the Newark College of Engineering was introduced, for the purpose of making a plea for cooperation of the manufacturing plants with the engineering instruction units. He told about the work of his college, which is now eight years old, and which is operated on the cooperative plan whereby the students spend half time in the college and half time in various sections of local industry. A new course has been inaugurated, called the twilight course, in which the students are occupied by their college work from 5 to 7 p. m. This is for men already engaged in regular industrial employment. It has been found possible to arrange with their employers to release them in the afternoon so that they can begin their work at the college at 5 o'clock.

Professor Brooks's plea was mainly for a larger measure of cooperation along the lines already outlined, and also in connection with the procurement of equipment for the college, and the utilization of the college's resources in solving the problems of industry, either in the laboratory or through examination of existing conditions in the various shops.

For every ship of 2000 gross tons or over that is now building in the United States or has been completed since 1921, Great Britain has 41; Germany 12; Italy five and France and Japan each approximately four, according to the eleventh annual report of the United States Shipping Board. It points out the inability of American ships built during the war to compete in speed and operating efficiency with the modern tonnage of foreign maritime nations. American ships, as a result, are getting more and more of the less desirable classes of cargo.

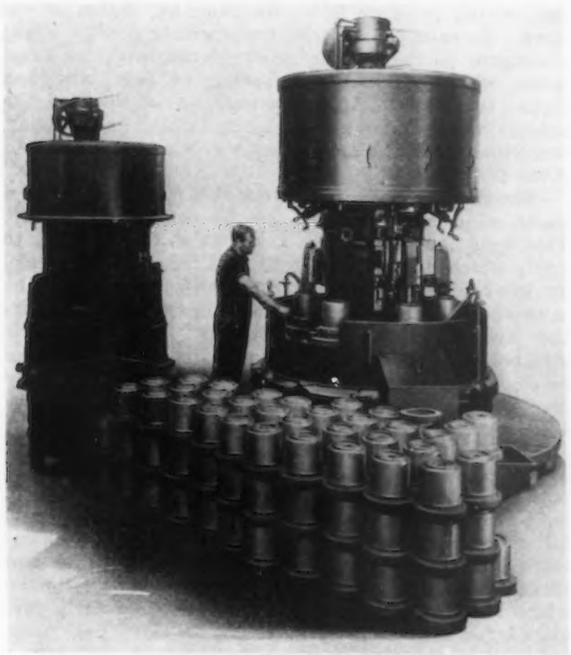
Varied Room and Floor Arrangements in Apartment Show Adaptability of Structural Steel



THE Floor Systems of No Two Stories of the Morewood Gardens Apartment in Pittsburgh Are Alike, as the Architectural Design Called for Numerous Apartments as Well as a Marked Variation in the Layout of Each Apartment. Standard type Junior beam floor construction was employed with the beams spaced at approximately 24-in. centers, carrying 2-in. concrete slabs on metal lath with wood sleepers embedded in the concrete to which the finished floor was nailed. The first floor and lobbies were designed to carry a load of 145 lbs. per sq. in., and the other floors a load of 115 lb. per sq. in. Where partitions were parallel with the beams a double line of Junior Beams was spaced to carry the load.

Adds 20-In. Six-Spindle Machine to Mult-Au-Matic Line

The Mult-Au-Matic line of the Bullard Machine Tool Co., Bridgeport, has been extended by the addition of a 20-in. six-spindle unit. The line now embraces 6-in. and 8-in. four-spindle models and 8-in., 12-in., 16-in. and 20-in. six-spindle machines.



Typical Work Includes the Machining of Cast Iron Drums and 8-In. Chuck Bases

Clear swing of 21½-in. diameter for 8 in. above the chuck face and 12-in. diameter for chuck work extending 17 in. high is provided in the new machine. The method of operation is the same as in the previous models: The work is chucked by the operator at the loading station, is periodically indexed through each of the five working stations for the respective operations, and finally returned for unloading. There are six pieces in process at the same time.

At the loading station there is a power-driven chuck-operating unit which connects with the respective spindles as they are presented in this position, and drives the mechanism provided in each spindle to actuate the standard three-jaw chuck. It may also be used to operate various special forms of work-holding devices which may be attached to the face of the spindle.

The tool heads provided at the five working stations may be of plain, compound, standard universal or double-purpose type providing respectively, vertical, horizontal, angular or a combination of vertical and horizontal tool traverse and feed. The full stroke of the head comprises 8⅛ in. of primary vertical movement, which, in the compound head, may be transformed to 4⅛ in. vertical and 4 in. horizontal movement. In the standard universal head the horizontal or angular travel of the head is 3 in., leaving 5⅛ in. vertical motion. The double-purpose head also provides 5⅛ in. vertical primary motion and 3 in. in secondary motion for vertical and horizontal slide traverse.

Spindle speeds, independently obtainable at each station, range from 5.3 to 131.7 r.p.m. and include 25 speeds. The tool feeds, independently variable for each head, range from 0.0033 in. to 0.1294 in. per revolution, including in all 19 changes.

The general construction of the 20-in. machine is similar in practically every unit to the other sizes, but the new size permits of heavier construction, with heavier cuts and a proportionally better support for the cutting tools. The base of the machine measures 81 in. in diameter and contains the reservoirs and pumps for lubricating oil and cutting compound. The central column rising from the base provides, on the lower portion, a bearing for the work spindle carrier, and in the hexagon upper section face bearings for mounting the tool heads. An opening in the sixth face provides convenient access to the gears and shafts within. This column supports an upper feed works base and the feed works units in the upper compartment. The upper compartment contains the individual feed works units providing independent feed and speed control for each station of the machine. It also has the centralized clutch and drive unit with indexing control. The machine can be arranged for either direct motor drive or belt drive. Under normal load the machine requires a 15-hp. motor, which may be mounted on the top of the machine.

To facilitate operation, and particularly tool setting, a main clutch control lever is provided at each station. Facilities are provided for either power or hand operation of each tool head independently.

Work on which it is claimed the machine has been used with marked advantage includes cast iron cam drums and 8-in. chuck bases.

"Shell Type" Motor for Woodworking and Other Machinery

A squirrel cage motor of the so-called shell type, an all-welded design, for use in various classes of woodworking and other machinery requiring high-speed motors, has been placed on the market by the Lincoln Electric Co., Coit Road and Kirby Avenue, Cleveland.

The motor is made to the standard dimensions of the trade, and is available in two sizes, 3 and 5 hp., respectively. The 3 hp. unit has an external diameter of 6.5 in. and an external length of 4.5 in. The 5-hp. machine is of the same diameter but is 6 in. in length. Both motors are manufactured for either

The Stator Is Secured to the Frame of the Machine and the Rotor Mounted on the Tool Shaft

two- or three-phase, 60-cycle current and a speed of 3600 r.p.m. The stator is made up of laminated sections arc-welded together. The welding is done while the shell is under pressure and is placed in six transverse slots. The rotor is also entirely arc-welded and provided with either a straight or tapered bore.

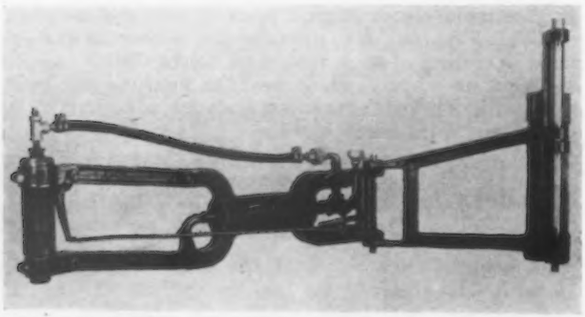
Advantages claimed by the company are as follows: "The welding does away with the necessity of a solid shell about the laminations and also replaces the usual rivets. Thus the amount of active field is kept at a maximum. The effect of this is to increase the magnetic flux and allow more copper to be used in the slot. Greater magnetic flux means better operating characteristics. This increase of copper makes for a cooler running motor and permits greater overload."

As normally used the stator is secured in the frame of the machine and the rotor is mounted on the tool shaft. If desired the stator will be supplied with six foot leads.

Pneumatic Tool for Riveting, Drilling and Other Operations

Riveting, drilling and other operations may be performed on the semi-portable radial pneumatic general-purpose tool illustrated, which has been added to the line of Guardian Products Co., 3050 East Eightieth Street, Cleveland. The tool consists of a frame that swings on a wall bracket, air-operated mechanism and a pneumatic hammer or other tool that is clamped to two arms that form the outer end of the frame. The clamps are designed for various sizes of standard tools.

The frame has two joints 43 in. long and will swing a half circle on a 38-in. radius and allow a 5-ft. straight



The Largest of Three Sizes of the Tool Is for Mounting on a Trolley for Use on Structural Steel

line travel along the front of a bench. It also has an up and down range at the tool end of approximately 10 in. The tool is swung into position by hand and its operation is controlled by a trigger. Air when applied acts on either a valve or bellows located in a cylinder near the center of the frame, causing the outer arms carrying the head to move downward to the required position over the work before it sets the tool in operation. When the machining operation is finished and the trigger is released, a spring causes the arms to move up, raising the tool to its non-operating position. Any desired speed may be obtained by an adjustment of the operating trigger.

The frame is portable in that it can be moved around the shop and set on fixed brackets at any convenient point and connections made with an air line. Pivoting and other attachments are provided. The frame will be made in three sizes, the largest to be mounted on a trolley for use in work on structural steel. It will also be made for use with electrically-operated tools, the pneumatic motor being replaced with an electric motor.

The tool is intended for use in die work and for production riveting and drilling operations in sheet metal shops, stove plants, electric motor and other metal-working plants. It may be fitted with a grinding or polishing wheel and used for screw driving and nut setting.

Improved Faceplate

An improved model of its Neva-Stop faceplate, designed to enable an engine lathe operator to change work done on centers without stopping his machine, has been announced by the McCrosky Tool Corporation, Meadville, Pa.

The Faceplate Is Screwed on to the Lathe Spindle and the Work Is Gripped and Driven by the Three Serrated Jaws

Three driving jaws are now employed, instead of two, which change is intended to provide better distribution of the driving power. The body of the faceplate is now made from a solid steel disk, and the front plate and guide plate have been strengthened. All wearing parts are hardened. The jaws are of alloy steel forgings and are hardened.

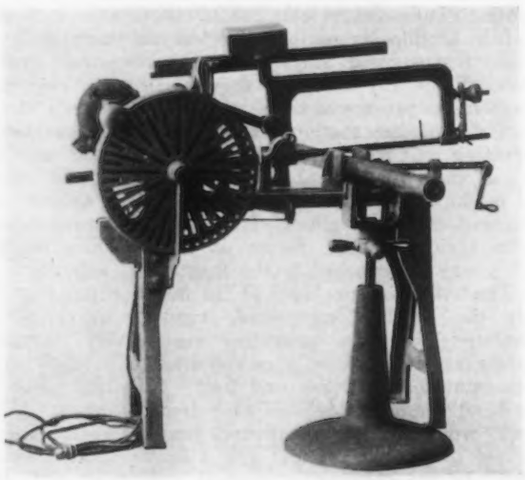
The device is screwed on to the lathe spindle. The work is gripped and driven by the serrated jaws, which are brought into contact with the work by springs, but the driving pressure is by the camming action of the jaws. To release the work the operator applies slight resistance on the outside collar of the revolving faceplate, which automatically opens the cam jaws and locks them open. After placing a new piece on the centers, the operator touches a trip located in the collar, whereupon the jaws are instantly released and begin to drive the work.

The improved faceplate can be furnished with a plain, wide collar in place of the collar with a trip. This type is operated by a simple friction brake, to apply which the operator steps on a treadle. The brake applies the necessary friction on the collar to open the jaws and hold them open. Releasing the brake permits the jaws to engage the work. This arrangement is stressed as increasing the speed with which work can be changed without stopping the lathe, and is especially recommended where one operator is in charge of more than one machine.

Although designed primarily for driving work that is concentric and symmetrical, the jaws of the device will adjust themselves to drive work that is slightly out of round. The faceplate is 8⅜ in. in diameter, overall, and the mount or body portion is 6⅝ in. in diameter. It is left blank so that it can be bored and threaded to fit the spindle of the particular lathe on which it is used. Two sets of jaws are regularly furnished, for work from ⅜ in. to 2½ in. in diameter, but jaws for larger diameters can be obtained.

Motor-Driven Geared Hack Saw Machine

Hack saw machines arranged for motor drive through gearing, as shown in the illustration, are being marketed by the North Wales Machine Co., Inc., North



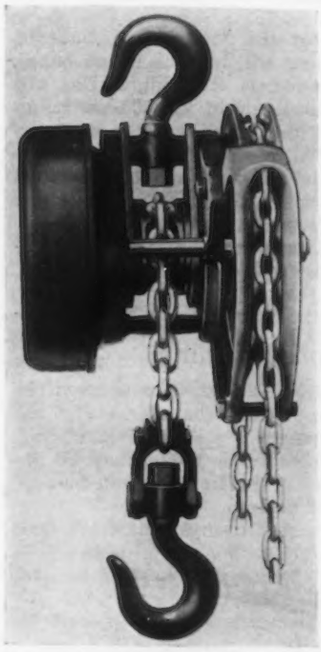
Swivel Vise and Automatic Shut-Off Are Provided. Gears in the drive are guarded

Wales, Pa. Three sizes, with capacity of 5 in., 6 in. and 7 in. respectively, are available.

A ¼-hp. 1725-r.p.m., 110-volt, 60-cycle, single-phase constant-speed motor is regularly supplied, but 220-volt or direct-current motors can be furnished. The machine is designed to allow 75 strokes a minute, at which speed it is claimed that 1½-in. bars of cold-rolled steel are cut in less than 2 min. Gears are completely guarded. The blade capacity of the 5-in. machine is 8 to 12 in.; of the 6-in. unit, 10 to 14 in.; and of the 7-in. machine, 12 to 16 in. The bar holder dimensions are as follows: Diameter of base, 16 in.; height of base, 15½ in.; and screw adjustment, 6 in. Extra screws for other height adjustments can be furnished.

Compact Type of Chain Hoist

Simplicity and compact construction, and interchangeability of all parts, are important features claimed for a new heavy-duty spur-geared ball-bearing chain hoist. Designed for high efficiency, easy operation and long life, it has been brought out by the Dickerman Hoist Mfg. Co., Cleveland. The load is carried by a one-piece steel load wheel with alloy steel ball bearings in steel suspension plates on each side. These



Chain Hoist (Left) Designed for Heavy Duty. Simplicity, compactness and interchangeability are emphasized

(At Right) Steel Bars 3 x 36 In. or 5 x 22 In. May Be Cut Cold. A pusher attachment feeds short pieces and gets rid of crop ends

plates are connected to the top hook. The top hook and cross head, the load hook and the driving pinion and shaft are steel forgings. The pinion cage is malleable iron and the gears and pinions are of alloy steel.

Both the load chain and the hand chain are electrically welded. A continuous non-fouling hand chain guide is provided which permits operation of the hoist from every angle. The hoist is claimed to be dirt and grit proof. The gearing is of the planetary type.

The hoist is made in the standard type in capacities of ¼ ton to 10 tons. In capacities above 10 tons it is made with two gear trains housed in separate gear cases, connected by a yoke.

Horizontal Duplex Double Seamer for Light Containers

A horizontal double-end machine for the rapid seaming of light steel containers has been added to the line of the Niagara Machine & Tool Works, Buffalo, N. Y. This machine, designated as the No. 309, is offered not only for such work as the seaming of grease drums, but also for the double seaming of 55-gal. "one-time" shippers.

The machine seams both ends of the drum simultaneously. Operation is controlled by three levers, which are conveniently located. Production at the rate of 300 small diameter packages, and 125 complete 55-gal. one-time shippers per hour is claimed. Either belt or individual motor drive arrangement can be furnished, a 25-hp. motor being required for driving the machine.

Compact design is a feature stressed. The main spindles carrying the chucks are mounted on large tapered roller bearings, and the individual first and second operation seaming rolls are also mounted on roller bearings. Movement of the right-hand column that clamps the drum and the motion of the roll cams are controlled by Johnson clutches. Rotation of the seaming chucks is controlled by a large single-disk clutch. All moving parts are accessible for lubrication and inspection. The weight of the machine is 10,000 lb.

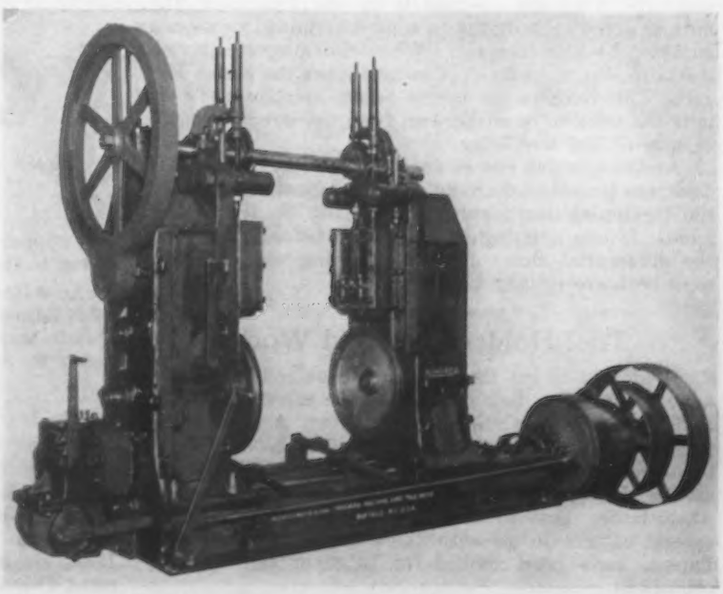
Shear with Capacity of Exerting 2750 Tons Between the Knives

Recently built at the Youngstown plant of the United Engineering & Foundry Co., the shear illustrated has a capacity of 5,500,000 lb. between the knives. It was designed to cut 3-in. x 36-in. or 5-in. x 22-in. of cold steel bars. Its stroke is 6¾ in. and it runs at 12 cuts a minute, being driven by a 250-hp. electric motor. It has an overall height of 20 ft. and is all steel in construction, except the bearings, which are of bronze.

The weight of the main housing is 125,000 lb. The ram is balanced at all points by a patented compensating spring balance. All gears are cast steel, with

double helical cut teeth. There is an oil gag on the entering side of the shear and all moving parts are lubricated by a circulating oil system from one central point. As the shear is of the four-post type, it occupies a minimum of floor space for its rating.

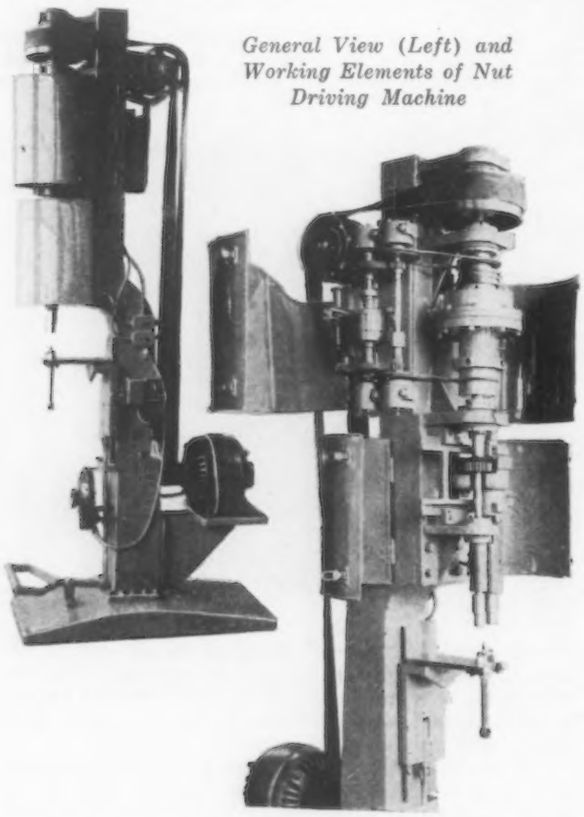
An auxiliary piece of machinery in connection with this shear is a special pusher for feeding short pieces and getting rid of crop ends. This pusher delivers the crop ends to an adjustable chute. The shear can be operated from a distant point by means of a motor-driven pull-out device for the clutch pin. The clutch is a patented non-knocking type with a positive pull-out and definite jaw clearance when out. A motor-operated gage also is part of the equipment for this particular shear.



Nut Driving Machine Designed to Expedite Assembling

Assembling operations requiring large numbers of nuts, capscrews, etc., are served by a new Reynolds nut driving machine, being placed on the market by Metalwood Mfg. Co., 3362 Wight Street, Detroit. The size illustrated has two spindles, and is adapted to assembling bearing caps, valve bonnets, motor end plates, connecting rods, etc. It is fitted for any pieces which require nuts or capscrews to be driven and tightened in pairs.

A substantial column rises from a base of such area that no part of the machine overhangs it. One of the two spindles is driven from differential as shown in the



General View (Left) and Working Elements of Nut Driving Machine

detailed view, while the other is driven through a quill gear and idler gear. This second spindle is mounted in a slide, which is adjustable crossways of the column to permit setting the spindles from 2 1/16 to 6-in. centers.

Each spindle carries at its lower end a detachable socket wrench which holds the nut or capscrew through magnetic windings. Actuated by the foot-lever, the nuts or screws are driven to a predetermined tightness, adjusted by the rheostat. When the magnetic clutch starts to slip, a mechanical switch opens the clutch circuit. This releases the torque on the spindles and permits the work to be withdrawn from the wrenches upon release of the foot-lever.

As the spindles run at about 500 r.p.m., the work is done much faster than by hand. Adjustments make the tightening more uniform than can be secured by hand. If one unit begins to tighten before the other, the differential slows down the leading nut or screw until both are equally tight.

Tool Holder for Rapid Work

Estimated to cut the time in two on rough work, a new tool holder is being placed on the market by A. C. Bellefleur & Son Co., New London, Conn. A wheel lathe equipped with this tool holder is said to be capable of turning a passenger car wheel in 4 min., while a locomotive tire can be turned in 8 min. on a special car wheel lathe. Several sizes of the tool holders and the special cutters to go with them are being marketed. Patents have been applied for to cover this type of equipment.

Gas Purifier to Be Built at Granite City Plant

The Semet-Solvay Engineering Corporation, New York, has been awarded a contract by the Management & Engineering Corporation, Chicago, for the construction of a purifier to be built on the plant of the St. Louis Gas & Coke Corporation, Granite City, Ill. Coke oven gas will be purified and piped to the mains of the Laclede Gas Light Co., St. Louis. Construction work will proceed at once.

The purifiers will be of the Steere type, built of steel and arc welded. There will be four round boxes, each 35 ft. in diameter and 12 ft. 6 in. high. Gas will be sent through at a normal rate of 270,000 cu. ft. an hour. The four boxes will contain 7700 sq. ft. of trays for holding oxide. Manifold piping will be of the forward rotating type. Any of the boxes can be by-passed when desired. The manifold will be made of welded steel piping, 20 in. in diameter, and fitted with Steere-Van Stone flanges and Steere gate valves. This will be the second Steere purifier to be built in Granite City.

Rapid Core Machine

A new rapid core machine designed to succeed the "hammer" type has been put on the market by the American Foundry Equipment Co., Mishawaka, Ind. This machine, designed for electric drive, may be operated by belt from overhead shafting. It can be supplied for hand operation if desired.

Adjustable force feed is said to insure uniform sand feed for all sizes of cores. The hopper is designed so that an auxiliary feed hopper may be used if desired.

Rapid and Ready Adjustment Is a Feature Claimed for This Core Machine

This hopper may be swung out of place to permit ready access to the conveyor chamber.

An adjustable tubular die holder permits rapid and ready adjustment of tube length for correct core density. This is said to effect considerable time saving, in addition to its flexibility.

Commercial Standard No. 1 for new billet steel concrete reinforcement bars, as accepted by associations and individuals listed in the publication, has been issued in pamphlet form by the United States Bureau of Standards. The standard becomes effective Jan. 1, 1928. Copies may be obtained for 5c. at the Government Printing Office, Washington.

Where Our Imports Come From

Leading Sources of Incoming Consumption Lines Provided in Each Instance More Than Half of Total

WASHINGTON, Dec. 6.—Of the total imports of 571,894 gross tons of iron and steel products into the United States during the nine-month period ended September, 1927, steel bars, shapes, cast iron pipe, other pipe, and pig iron constituted 70.35 per cent. For the corresponding period of last year these five items represented 72.9 per cent of the total imports of 871,407 tons. In the 1927 movement there were 72,463 tons of steel bars imported, representing 12.67 per cent of the total; 119,660 tons of shapes, the greatest item of all, representing 20.92 per cent; 69,350 tons of cast iron pipe, 12.12 per cent; 43,158 tons of other pipe, 7.55 per cent and 94,449 tons of pig iron, 16.51 per cent.

A striking contrast is shown in the nine months for 1926. During this period steel bar imports of 80,075 tons were 9.19 per cent of the total; the 84,405 tons of shapes made up 9.69 per cent; the 55,848 tons of cast iron pipe, 6.41 per cent; the 18,598 tons of other pipe, 2.13 per cent and the 394,583 tons of pig iron, 45.3 per cent. The sharp decline in imports of pig iron, the outstanding change in the two movements, was due principally to the decline in domestic prices, together with the increase in foreign prices and the increased activity of domestic merchant furnaces serving Atlantic seaboard markets. The application of the anti-dumping penalty against imports of pig iron from Germany had little, if any, effect in restricting the incoming movement. Neither, apparently, had the addition of 50 per cent to the duty on pig iron.

However, Germany was the leading source of pig iron imports during the 1926 period, supplying 124,610 tons, while the United Kingdom ranked second, providing 92,039 tons. British India was third with 80,775 tons. In the 1927 period India ranked first, with 44,142 tons; the Netherlands second, with 20,791 tons; the United Kingdom third, with 15,035 tons. Germany dropped to fourth position, with only 9371 tons.

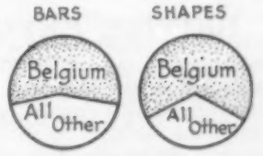
Leaders' Dominance Heavy in Finished Lines

During both periods Belgium was the principal source of imports of steel bars and structural shapes, supplying 39,574 tons, or approximately 54 per cent of the total imports of this product during the nine-month period of 1927, and 42,742 tons, or about 53 per cent of the total, for 1926. In structural shapes, Belgium supplied 80,412 tons, or 67 per cent of the total of this movement, during the nine months of 1927, and 58,848 tons, or about 70 per cent of the incoming shipments, during the 1926 period.

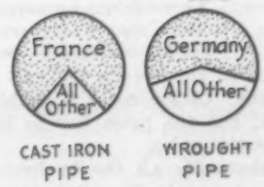
France led as the source of imports of cast iron pipe for both periods, supplying 53,335 tons, or approximately 77 per cent of the total during the nine months of 1927, and 39,283 tons, or about 70 per cent

IMPORTS FOR NINE MONTHS ENDED SEPTEMBER, 1927-26
(In Gross Tons)

Ports of Entry and Countries of Origin	Steel Bars		Shapes		Cast Iron Pipe		Other Pipe	
	1927	1926	1927	1926	1927	1926	1927	1926
Atlantic:								
Belgium	12,342	9,952	47,469	36,459	1,768	5,221	....	36
France	7,592	5,632	13,184	4,439	29,490	24,039	159	102
Germany	2,594	2,287	10,107	8,771	1,418	11	1,784	2,541
Netherlands	437	4,065	40	802	....	....	310	763
Sweden	5,471	5,679	....	....	....	....	257	354
United Kingdom	983	711	626	400	....	22	1,927	2,176
Canada	....	....	32	70	1	....	2,524	1,594
All other	106	212	458	....	453	....	....	....
Total	29,525	28,538	71,916	50,941	33,130	29,293	6,961	7,566
Gulf:								
Belgium	7,960	17,252	15,465	11,311	....	....	1,263	1,198
France	947	4,390	439	....	7,007	1,320	1,027	647
Germany	1,196	5,011	8,091	4,961	....	....	2,207	245
Netherlands	....	....	66	3,657	....	....	....	....
Sweden	108	233	....	....	....	....	....	....
United Kingdom	....	....	....	....	....	....	....	139
Canada	....	....	....	....	....	....	....	....
All other	11	....	77	....	1,594	....	....	....
Total	10,222	26,886	24,138	19,929	8,601	1,320	4,497	2,229
Pacific:								
Belgium	17,536	15,319	16,116	11,004	10,775	6,646	1,709	....
France	2,804	481	3,326	3	16,837	6,801	2,931	239
Germany	5,707	4,054	790	927	....	1,472	21,327	7,666
Netherlands	138	136	....	171	....	946	81	....
Sweden	155	133	....	....	....	....	....	....
United Kingdom	....	....	12	97	....	....	29	....
Canada	....	....	....	....	....	....	....	....
All other	49	....	54	60	....	....	1,106	156
Total	26,389	20,123	20,298	12,262	27,612	15,865	27,183	8,173
Other Ports:								
Belgium	1,736	219	1,362	74	2	990	27	....
France	55	21	218	19	1	7,123	4	1
Germany	1,797	1,086	1,495	699	1	....	36	65
Netherlands	611	368	492	386	....	....	....	....
Sweden	1,068	987	....	....	....	....	....	....
United Kingdom	580	554	50	18	....	1	159	....
Canada	97	155	108	77	3	680	373	26
All other	383	1,138	75	....	....	576	3,918	538
Total	6,327	4,528	3,308	1,273	7	9,370	4,517	630
Grand Total	72,463	80,075	119,660	84,405	69,350	55,848	43,158	18,598



SHOWING the Extent to Which the Leading Source of Imports in Four Lines of Iron and Steel Overshadowed All Its Competitors. Belgium had the lion's share of the bars and shapes, while France dominated in cast iron pipe and Germany in seamless tubes



IMPORTS FOR NINE MONTHS ENDED SEPTEMBER, 1927-1926
(In Gross Tons, for All Ports of Entry)

Countries of Origin	Steel Bars		Shapes		Cast Iron Pipe		Other Pipe	
	1927	1926	1927	1926	1927	1926	1927	1926
Belgium	39,574	42,742	80,412	58,848	12,545	12,857	2,999	1,234
France	11,398	10,524	17,167	4,461	53,335	39,283	4,118	989
Germany	11,294	12,438	20,483	15,358	1,813	1,483	25,354	10,516
Netherlands	1,186	4,569	598	5,016	.....	946	391	763
Sweden	6,802	7,032	.....	.....	.....	.....	257	354
United Kingdom	1,563	1,265	688	515	.....	23	2,115	2,315
Canada	97	155	140	139	4	680	2,897	1,620
All other	549	1,350	664	60	2,047	576	5,024	3,923
Grand total	72,463	80,075	119,660	84,405	69,350	55,848	43,158	18,598

IMPORTS OF PIG IRON FOR NINE MONTHS ENDED SEPTEMBER, 1927 AND 1926
(By Region of Entry, in Gross Tons)

	Total Imports		Atlantic Seaboard		Gulf Ports		Pacific Coast		Other Ports	
	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926
India	44,142	80,775	32,725	69,643	2,389	2,737	8,811	7,366	217	1,029
Belgium	499	6,138	100	3,887	.....	550	399	1,701	200	.....
France	2,500	26,833	2,500	26,183	.....	450	.....	200	.....	.....
Germany	9,371	124,610	5,581	109,706	1,075	3,300	2,065	9,604	650	2,000
Netherlands	20,791	57,600	18,336	53,016	30	600	1,675	2,228	750	1,756
Sweden	1,142	2,795	515	2,397	.....	.....	300	5	327	393
United Kingdom	15,035	92,039	14,815	81,377	.....	6,700	90	150	130	3,812
Canada	689	3,791	.....	500	.....	.....	.....	37	689	3,254
All other	80	2	.....	.....	.....	.....	.....	.....	80	2
Total	94,449	394,583	74,572	346,709	3,494	14,337	13,340	21,291	3,043	12,246

of the total of the 1926 movement. In "other pipe," made up largely of seamless tubes, Germany was the leading source of imports during both periods. In the nine months of 1927, Germany furnished 25,354 tons, or approximately 59 per cent of the total. In the 1926 period 10,516 tons, or about 57 per cent, came from Germany.

Atlantic Ports Received Largest Tonnages

The Atlantic seaboard led by a wide margin in both periods as the area of greatest receipts of the imports of the five lines here considered. During the nine months of 1927 imports into Atlantic ports totaled 216,104 tons, of which 141,532 tons covered the four finished lines and 74,572 tons was pig iron. During the nine months of 1926 imports into Atlantic ports amounted to 463,047 tons, of which 116,338 tons were the four finished products and 346,709 tons was pig iron.

The Pacific Coast was the second largest recipient of these imports, taking 114,822 tons during the nine months of 1927. Of this total, 101,482 tons consisted of the finished products and 13,340 tons of pig iron. Receipts at Pacific ports during the nine months of 1926 totaled 77,714 tons, of which 56,428 tons consisted of the finished products and 21,291 tons was pig iron. Receipts at Gulf ports during the nine months of 1927 totaled 50,952 tons, of which 47,458 tons consisted of the finished lines and 3494 tons of pig iron. The total for the 1926 period was 64,710 tons, consisting of 50,364 tons of the finished products and 14,337 tons of pig iron.

BRITISH EXPORT QUIET

Continental Iron Imports Checked, but Export Is Small

LONDON, ENGLAND, Nov. 25.—There have been no important changes in the iron and steel market lately. Pig iron consumers appear to have covered their immediate needs, so far as Cleveland iron is concerned, and the volume of business at present is small. Cleveland furnaces are still unable to compete successfully with Continental iron abroad, so that export trade continues dull, but importation of foreign iron into this country has to some extent been checked. However. there are still considerable quantities of foreign iron arriving on old orders. Most of this is going to Scotland and the Midlands, where local producers are unable to compete. In the Middlesbrough district, however, the outlook is regarded more hopefully and Cleveland makers are anticipating a revival of business by the turn of the year. No additional blast furnaces have been blown in and the stocks are being rapidly consumed.

The position of the hematite iron producers is rather different. There is no agreement of makers to control prices, so that manufacturers have been engaged in keen competition to secure orders, mostly for export. Stocks of this grade of iron are still heavy and increasing. Occasionally a sizable lot is sold to the Continent, but the price has to be drastically reduced to secure the order.

Practically all the business in semi-finished material is taken by Continental mills, as the margin between quotations of foreign and British makers is wide. In finished iron and steel there is a little more activity in the domestic field, but export demand is still small. Shipyards, structural shops, engineering plants and the railroads are all moderately busy, but there is room for improvement with current demand well below capacity. The tin plate market has improved considerably since the fixing of a minimum price and some good business has developed.

According to report, the new corporation, Vickers-Armstrong, Ltd., which is a merger of the naval shipbuilding, armament and special steel departments of Vickers, Ltd., and Sir W. G. Armstrong, Whitworth & Co., will have capital stock not to exceed £21,000,000, of which Vickers, Ltd., will receive £8,500,000 and Sir W. G. Armstrong, Whitworth & Co. £4,500,000 as purchase price for their plants.

Ryerson Takes Over Sale of Glasgow Iron

Joseph T. Ryerson & Son, Inc., has taken over the exclusive sale of Glasgow iron billets to the railroads of the country. Glasgow iron is a puddled, doubly refined, rolled wrought iron, made by the Glasgow Iron Co., Pottstown, Pa. This firm, organized in 1876, is a well known manufacturer of iron plates, bars, billets and boiler specialties. Glasgow billets are a hand-puddled product, made wholly from pig iron, double refined and slab piled. After the billets are rolled to size the ends are cropped and inspection is made for blisters to insure a strong, clean iron, free from seams or other defects.

The material is used for forging draw bars, car parts, equalizers and various other forgings where a high grade iron is needed. The billets are furnished in sizes from 2½ to 8 in. thick and from 6 to 18 in. wide, and also in 6 to 10-in. squares in the usual lengths.

Health Hazards of Brass Foundries

Ague or Oxide Chills More Intense in Buildings Closed Against Winter Weather—Due to Zinc Oxide from Open Ladles

EMPLOYEES in 22 brass foundries in the New York metropolitan area were examined by J. A. Turner and L. R. Thompson of the United States Public Health Service and their findings are included in Public Health Bulletin No. 157 of the above title. Foundries of various sizes and ages were included in the study, in order to approximate a cross section of the American industry. It was generally found that the illumination is poor—not enough windows are provided for daylight and those which exist are very dirty. Since little or no night work is done, artificial lighting systems are meager and in poor repair.

Poor Ventilation Results in Dusty Atmosphere

The same general insufficiency of ventilation through skylights and monitors was noted. Furnace hoods are generally too small, therefore copious fuming occurs during drawing from a pit furnace or pouring a Swartz furnace. Contrasted with this, dusts from sand blasting and grinding operations are much better handled. Counts of dust particles varied from 41,400 per cu. ft. of air in the cleanest molding room, to 4,463,000 in the dustiest foundry where molding, melting, pouring and shaking out were simultaneously in progress. Zinc and iron were chemically determined in appreciable amounts in all dust samples collected but one.

Since melting, pouring and molding are usually done in one room, or in interconnecting rooms without effective partitions, the greatest health hazard to molders appears to be the copious metal fumes coming from the furnaces or from the ladles during pouring. This is especially dense in winter months, when window and door openings are closed against the cold. Of the 340 employees in these foundries, 212 were examined, of whom 42 foremen and core makers were not exposed to these fumes to any extent. Of the remainder, 102 are affected with periodic attacks of "brass founders' ague," while the remaining 68 appear to be immune, even after long employment.

Overheating Principal Danger to Core Makers

In the core room, the principal health hazard consists of the danger that the workmen may become overheated when loading or unloading the ovens, and later go outside to cool in sweat-damp clothes.

In the cleaning department, suction ventilation of the sand blasting machines is an absolute essential. Some foundries follow the very good rule of rotating employment, so that a workman will remain no more than a year or two at this occupation. Chipping and grinding require goggles, which are too frequently laid aside.

"The upkeep and cleanliness of the sanitary facilities and rooms were noted as fair in only two plants; in the remaining 20 plants they were unsatisfactory," the authors write. "In only two plants was any recognition found of the fact that a neat appearance of the washing facilities promotes their use. In only one plant were there any facilities for cooling drinking water during the summer months."

General Physical Condition of Molders

After inquiry had developed the fact that 102 of 170 molders are subject to recurrent attacks of ague, the individual workmen were studied by Messrs. Turner and Thompson. No indications of systemic underweight were found (when compared with composite results from all industries studied by the Public Health Service). Blood pressure in the affected group is consistently higher by about 5 mg. than that in the exposed and unaffected group, which latter does not vary from the general average of all American workers. Men subjected to recurrent attacks of ague average more defects and diseases than those immune to the fumes, especially men 10 years or more in service.

Vision in all brass molders is noticeably better than the Public Health Service averages; consequently brass founding is not a hazard to vision despite the prevalence of inflamed eyelids among the workmen.

Prevalence of Brass Founders' Ague

Molders had their first attack of ague fairly soon after entering brass foundry work—50 per cent of the susceptible ones reporting it to occur within three months. As noted, the disease is especially prevalent in winter—some workmen maintaining that it is exposure to cold evening air which brings on the attacks. "Questioning the men who had been employed at the trade for years without experiencing any ill effects brought out the opinion that their escape was due to the well-ventilated condition of the shops in which they were employed."

Premonitory symptoms arrive four to six hours after exposure to excessive fumes, and consist of dull headache, metallic taste, thirst, throat irritation and burning eyes. These increase in intensity until headache becomes severe, accompanied by chills and rigors or cramps more or less intense. This phase ultimately is succeeded by a feverish state and profuse sweating, the final stage. Ordinarily the patient loses no time from work; the next morning he has a mild indisposition and often thirst.

Messrs. Turner and Thompson hold that the ague is due to zinc oxide fumes in the foundry atmosphere. They cite the fact that typical attacks have been induced in foundrymen and volunteer subjects by exposing them to fumes from chemically pure zinc. They note the fact that workers in plants making zinc oxide for pigment do not suffer from the ague, but believe this is due to the fact that such workers are subjected to constant and more severe exposure and therefore develop immunity. Many such workers do have ague in the early years of their employment, and even after acquiring immunity they constantly show the mild early symptoms, such as dry nose and throat, slight headache and minor digestive trouble.

Maintenance of Wagon and Motor-Truck Scales

From a booklet entitled "Knife-Edge Scales, their use and maintenance," issued by Buffalo Scale Co., Inc., 1200 Niagara Street, Buffalo, N. Y., the following instructions for the care of wagon scales are abstracted:

1. Clean platform frequently—at least once a day.
2. Be sure nothing is wedged or frozen into crack around edge of platform.
3. Balance the beam after each cleaning.
4. When not in use return poises to zero and thus keep close check on balance.
5. Do not allow dust, rubbish or water to accumulate in scale pit.
6. Keep all pivots and bearings (except on shelf lever and end of cross lever) well packed with Gredag No. 53. Once a year old grease should be thoroughly washed out with gasoline (not kerosene) and renewed.
7. Clean and repaint entire scale (except pivots and bearings) once a year.
8. Check rods should have ⅛ in. play, no more nor less.
9. Verify scale with test weights frequently, grouping weights on each corner in succession.

INVENTORY CUT 58 PER CENT

Survey Shows How New England Manufacturer Uses Research in Reducing Costs

AMONG New England industries which cooperated by furnishing data in a recent survey conducted for the New England Council was the Morgan Construction Co., Worcester. This company manufactures rolling mills, gas producers, wire mill machinery and steel melting furnace controls.

It was natural that there should be a great variety of machine designs which are seldom called for and the maintenance of which costs much. The company, desirous of operating on the most efficient and profitable basis, undertook an extensive research into ways and means by which standardization and simplification might be effected. For the last three years the research department, under the direct supervision of the vice-president, has devoted its entire attention to the problems of standardization and simplification. The benefits which have accrued from their studies were largely responsible for a 58 per cent reduction in inventories.

Elimination of Little-Used Styles

The findings of the research department covered every phase of the business. For instance, it was found that the proper selection and simplification of materials was of vast importance in keeping machines working with the least confusion and change. It was also revealed that there were many uses and designs of machines specified by the steel trade which were called for too infrequently to warrant their continued manufacture. These styles were eliminated, with the usual economies resulting from simplification. The conclusions of the research department led to other changes in manufacturing processes.

Roll housings, for example, were formerly built in 50 different sizes and types. This number has been reduced to two types, with 12 sizes in each type, or 24 in all. Pinion housings were formerly made in three types requiring 30 different sizes. The company now puts out one type in 12 sizes. Similar procedures have been applied to the entire production, so that specific sizes and types are prescribed for each machine. The results have been that materials for service requirements are easily stocked, repair orders are more promptly met, the cost of storage of patterns is considerably lower, and worthwhile savings are made in jigs and fixtures.

Largest Saving in Lessened Inventories

However, the biggest saving brought about by this thorough policy of standardization and simplification was the decrease in inventories. As an example, mill construction calls for quantities of steel angles. To meet former requirements it was necessary to carry in stock 74 different sections. The new practice has reduced this unwieldy number to a more convenient 11 sections. It has been a comparatively simple matter to have all new developments conform to required standards.

This interesting business experience is but one of many uncovered during a survey undertaken to determine the extent to which research has been employed by New England industries in the solution of everyday problems. The investigation was conducted among more than 300 companies, which gave their willing support and cooperation. The survey included a wide range of industries, such as shoes, textiles, machinery, toys, paper, silverware and many others typical of New England. Some of the companies were large, some were small. Some were located in or near large cities, while others were found in remote country places.

Descriptive Booklets Being Prepared

The findings of the survey dropped quite naturally into three easily definable classifications: Use of Research in Sales, Use of Research in Production and Use of Research in Employment Stabilization. Booklets describing the practical use of research, in each of the three classifications, are in preparation. A preliminary report recording the findings of the survey in summary form is already available. A copy may be had by addressing the Policyholders Service Bureau of the Metropolitan Life Insurance Co., New York, which conducted the survey.

Boston Engineers to Consider Welding

Joint meetings of the Affiliated Technical Societies of Boston will be held Wednesday, Dec. 14, to consider various phases of welding. All meetings will be held at the Boston City Club, except the morning session, which will be at Tremont Temple.

The schedule follows: 10 a. m., structural welding; 1 p. m., luncheon, under auspices of New England Water Works Association; 2 p. m., pipe welding; 6.30 p. m., annual dinner of affiliated societies; 7.30 p. m., miscellaneous applications of welding.

At each session several papers will be read, among which may be noted "Unit Stresses and Reliability as Applied to Structural Welding," by Fred T. Llewellyn, United States Steel Corporation, and "Replacing Castings by Steel Elements Cut to Shape by Automatic Shape Cutting Machine," by Dr. A. Krebs, General Welding & Equipment Co., Boston.

Recent Business in Massachusetts

Massachusetts industrial demands in October dropped more than 5 per cent, according to the Associated Industries of Massachusetts' index of orders, compiled from more than 200 concerns representing $350,000,000 invested capital and 100,000 employees. The decline was not general, for the actual demand on individual concerns increased in as many cases as it decreased, but decreases more than offset the value of increases. The average of orders for October was 96.1 per cent of the 1926 monthly average, while the September figure was 101.4 per cent. It is intimated the November figure may show a slight comeback.

Gross business booked by the B. F. Sturtevant Co., Hyde Park district, Boston, in the twelve months ended June 30 last, approximated $7,000,000. August and September were rather quiet months with the company, but November business was substantially larger than for the corresponding month last year, and the probabilities are the 1928 volume of business will be greater than that for the fiscal year ending with June.

Output of Electricity a New Record

Production of electric power by public utility power plants in the United States in October is reported by the Geological Survey at 6904 millions of kwhr. This is an increase of nearly 5 per cent from the September total of 6600. It is a gain of 5 per cent over the output for October, 1926. So far this year every month has shown a consistent gain over the corresponding month of any preceding year and the total in October was the highest for any month on record. The previous record was held by December, 1926.

Schedule of the next installments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***Dec. 15****—Activity in Steel Consuming Industries;* ***Dec. 22****—Position of Iron and Steel Producers;* ***Dec. 29****—General Business Outlook.*

NEW NAIL CARD ISSUED

Revised Extras Include Both Advances and Reductions, with Preponderance of Former

A NEW card of extras on wire nails was issued by the American Steel & Wire Co., effective Dec. 1. The revised card includes both advances and reductions, but it is said that on the average they mean an advance of 15c. to 20c. per keg. However, a discount of 10 per cent is allowed on orders of a carload or more. Simultaneously with the issuance of the new card, the company advanced its base price to $2.55, base per keg, Pittsburgh or Cleveland. It is understood that other nail makers have taken similar action both with respect to the base price and the extras.

In common wire nails, 20 to 60d, which formerly took the base price, now carry an extra of 25c. per 100 lb. The extra on 2d nails, which was formerly $1.45, has been raised 20c. to $1.65. On 3d to 7d nails, inclusive, the extras are unchanged, except for a reduction of 5c. on 5d. On 8d nails the extra has been advanced 20c. to 50c.; on 9d it has been raised 15c. to 45c.; on 10d, 20c. to 40c.; on 12d, 20c. to 35c.; on 16d, 20c. to 30c.

Extras on cement coated nails, on regular head barbed roofing nails and on No. 8 gage barbed dowel pins have not been changed.

In casing nails the extra on 2d remains unchanged, while there are reductions on 3d to 7d, inclusive, and advances on 8d to 40d. In finishing nails the extra on 9d is unchanged and there is a reduction on 6d, but other sizes have been advanced. The extras on all sizes of flooring brads have been raised. In common brads, extras on 3d, 4d, 6d and 7d are unchanged, and there is a reduction on 5d, while other extras have gone up. The extras on shingle nails have been raised. In smooth box nails the extra on 2d is unchanged and there have been reductions on 3d to 7d, inclusive, but extras on 8d to 40d have been advanced. Extras on slating nails are unchanged except for an advance on 3d. All sizes of fence nails take higher extras. In bright hinge nails, 4d and 6d (light) and 6d (heavy) have been reduced and 4d (heavy) is unchanged, while other extras have been raised. Boat nails, which formerly took extras of 25c. per 100 lb. over hinge nails, now have separate extras, all of which represent substantial reductions. Extras on fine nails are unchanged except for advances on 2d and 3d extra fine. Extras on bright clinch nails have been advanced except in the case of 2d, which is unchanged. All sizes of bright barbed car nails take higher extras, and the same is true of sterilized blued lath nails, smooth berry box nails and spikes.

In bright clout nails the extras on ¾, ⅞ and 1-in. have been reduced and that on 1⅛-in. is unchanged, while those on 1¼, 1⅜ and 1½-in. have gone up. In barrel nails the extra on 1¼-in. is unchanged and the extras on ⅝, ¾, 1⅜ and 1½-in. have been raised, while lower extras are quoted on ⅞, 1 and 1⅛-in.

Effective December 1, 1927
Cancelling all previous issues

American Steel & Wire Company

Standard Nail Card

Extras on Standard Wire Nails in Kegs

Common Nails	
2d	$1.65
3d	1.15
4d	.80
5d	.70
6d	.60
7d	.55
8d	.50
9d	.45
10d	.40
12d	.35
16d	.30
20d	.25
30d	.25
40d	.25
50d	.25
60d	.25

Casing Nails	
2d	$1.70
3d	1.20
4d	1.05
5d	.95
6d	.70
7d	.65
8d	.60
9d	.55
10d	.50
12d	.45
16d	.40
20d	.30
30d	.30
40d	.30

Flooring Brads	
6d	$0.65
7d	.60
8d	.55
9d	.50
10d	.45
12d	.40
16d	.35
20d	.30

Boat Nails	Bright Light	Bright Heavy
4d	$0.95	$0.95
6d	.80	.80
8d	.75	.75
10d	.70	.80
12d	.65	.75
16d	.60	.70
20d	.55	.65

Common Brads	
2d	$1.70
3d	1.20
4d	.85
5d	.75
6d	.65
7d	.60
8d	.55
9d	.50
10d	.45
12d	.40
16d	.35
20d	.30
30d	.30
40d	.30
50d	.30
60d	.30

Shingle Nails	
3d	$1.05
3½d	.85
4d	.80
5d	.70
6d	.65

Smooth Box Nails	
2d	$1.65
3d	1.15
4d	1.00
5d	.90
6d	.65
7d	.60
8d	.55
9d	.50
10d	.45
12d	.40
16d	.35
20d	.25
30d	.25
40d	.25

Siding Nails
Same advance as Smooth Box Nails

Slating Nails	
2d	$1.20
3d	1.00
4d	.85
5d	.75
6d	.65

Barbed Roofing Nails Regular Head	
⅝-inch	$1.55
⅞-inch	1.30
1 -inch	1.20
1⅛-inch	1.10
1¼-inch	.95
1⅜-inch	.90
1½-inch	.80
1¾-inch	.75
2 -inch	.65

Fence Nails	
5d	$0.60
6d	.55
7d	.45
8d	.45
9d	.40
10d	.40
12d	.35
16d	.30
20d	.25

Hinge Nails Bright	Light	Heavy
4d	$0.95	$0.95
6d	.80	.80
8d	.75	.75
10d	.70	.80
12d	.65	.75
16d	.60	.70
20d	.55	.65

Finishing Nails	
2d	$2.25
3d	1.60
4d	1.45
5d	1.35
6d	.80
7d	.75
8d	.65
9d	.60
10d	.55
12d	.50
16d	.45
20d	.35

Fine Nails	
2d	$2.20
2d Extra	2.40
3d	1.60
3d Extra	2.15

Clinch Nails Bright	
2d	$1.55
3d	1.35
4d	1.10
5d	1.00
6d	.90
7d	.85
8d	.80
9d	.75
10d	.70
12d	.65
16d	.60
20d	.55

Barbed Car Nails Bright Light	Bright Heavy
4d $1.05	$0.95
5d .85	.80
6d .80	.75
7d .70	.70
8d .70	.70
9d .65	.65
10d .65	.65
12d .60	.60
16d .55	.55
20d .50	.50
30d .50	.50
40d .50	.50
50d .50	.50
60d .50	.50

Clout Nails Bright	
¾-inch	$2.40
⅞-inch	1.75
1 -inch	1.55
1⅛-inch	1.50
1¼-inch	1.35
1⅜-inch	1.25
1½-inch	1.20

Barbed Dowel Pins	No. 8	No. 9	No. 10	No. 11	No. 12
⅝-in.	$1.75	$1.90	$2.00	$2.20	$2.45
¾-in.	1.50	1.65	1.75	1.90	2.15
⅞-in.	1.35	1.50	1.60	1.75	2.00
1 -in.	1.25	1.40	1.50	1.65	1.90
1⅛-in.	1.15	1.30	1.40	1.50	1.75
1¼-in.	1.10	1.25	1.35	1.45	1.70
1⅜-in.	1.05	1.20	1.30	1.40	1.65
1½-in.	1.00	1.15	1.25	1.35	1.60
1¾-in.	.95	1.10	1.20	1.30	1.55
1¾-in.	.90	1.05	1.15	1.25	1.50
2 -in.	.85	1.00	1.10	1.20	1.45

Sterilized Blued Lath Nails	
2d	$2.55
2d Light	2.75
3d	1.95
3d Light	2.50

Barrel Nails	
⅝-inch	$2.45
¾-inch	2.10
⅞-inch	1.45
1 -inch	1.25
1⅛-inch	1.20
1¼-inch	1.15
1⅜-inch	.95
1½-inch	.90

Berry Box Nails Smooth	No. 16	No. 17
¾-in.	$2.80	$3.00
⅞-in.	2.55	2.75
1 -in.	2.35	2.55
1⅛-in.	2.30	2.50
1¼-in.	2.25	2.45

Spikes	
10d	$0.40
12d	.35
16d	.30
20d	.25
30d	.25
40d	.25
50d	.25
60d	.25
7-inch	.25
8-inch	.35
9-inch	.35
10-inch	.45
12-inch	.45

Special Extras on Standard Wire Nails

(Except as provided above)

Annealed Nails, 25c per 100 lbs. extra.
Blued Nails, 35c per 100 lbs. extra.
Barbing Nails, 25c per 100 lbs.

Special Heads, 15c per 100 lbs. extra.
Special Points, 15c per 100 lbs. extra.
Galvanizing, prices on application.

Protest Filed Against Proposed Increase in Wire Rod Rates

WASHINGTON, Dec. 6.—Manufacturers and users of steel rods have filed a protest with the Interstate Commerce Commission against the proposal of railroads in Official Classification territory to apply fifth class rating to this product. Tariffs which cancel the current specific commodity rates on rods in coils, by eliminating them from the billet list, were filed to become effective Dec. 10. The proposed increase in rates is based upon the decision of the commission in the Standard Nut & Bolt Co. vs. the New York, New Haven & Hartford Railroad, and consolidated cases. The decision held that the rates assailed—rates on rods or bars, in straight lengths—were not unreasonable, but that they were unjustly discriminatory to the extent that they exceeded rates on the same products when shipped in coils.

The protestants, composed of 11 manufacturers, 10 manufacturers and users and 24 users, declare that the proposed tariffs provide for increases ranging from 33.6 to 56.5 per cent. To support their contention they cite rates applying and proposed from Pittsburgh. The present rate from Pittsburgh to Chicago is $5.50 per gross ton. The proposed rate is 34c. per 100 lb., or the equivalent of $7.616 per gross ton, an increase of 38.4 per cent; the rate to Cleveland is now $2.90 and would be increased to 19c. per 100 lb., or the equivalent of $4.256, an increase of 46.7 per cent; the rate to New York is $5.70 and would be increased to 34c., the same as the rate to Chicago, an increase of 33.6 per cent. The protest goes at some length into the variance of views as to what constitute wire rods, bars, etc., and the rating on such products when in straight lengths or coils. It is contended that the tonnage affected in the various wire rod cases covered but a negligible percentage of the tonnage affected by the new tariffs.

Tariffs Filed Reducing Export Rates

WASHINGTON, Dec. 6.—Railroads in Central Freight Association and Trunk Line territories have completed filing tariffs, reducing by 20 per cent the export rate on iron and steel products. The tariffs have been filed to become effective Dec. 31 and are experimental, to last one year. The Pittsburgh-New York rate is reduced from 25.5c. per 100 lb. to 20.5c.; the Pittsburgh-Baltimore rate, from 22.5c. to 17.5c.; and the Pittsburgh-Philadelphia rate, from 23.5c. to 18.5c. The Chicago-New York rate is reduced from 42.5c. to 34.5c. From Central Freight Association territory points west of Pittsburgh the new rates are based on a percentage relationship with the Chicago rate. The new rates are 60 per cent of the domestic rates. The tariffs also provide for an increase to 45,000 lb. from 36,000 lb. as the minimum carloading. It is believed protests will be filed asking suspension of the tariffs.

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This Issue in Brief

Machine card record is a necessity in the well-conducted plant. Not only should the card show date of installation, description, price, etc., but also repair data and yearly depreciated value. The record gives useful information concerning the durability of the machine and the kind of care it has received.—Page 1588.

Reward employees according to their contribution to the success of the business, says Schwab. Industry is a cooperative undertaking. Employee stock ownership, steady employment, and safeguarding of life and health are elements of human engineering worthy of the engineer's study. — Page 1591.

Machine the cope side of the casting first and thereby reduce "rejects." As the cope side is most liable to damage, castings can frequently be saved by machining heavily here, when defects are small, and taking a lighter cut on the other side.—Page 1593.

Compulsory arbitration of labor disputes is opposed by Secretary of Labor Davis. But his argument is unconvincing and unsatisfying, says editorial, as the rights of the public apparently have been weighed lightly, if at all.—Page 1608.

For quantity buying of steel, shall the differential be a discount or an extra? A list of quantity extras would not appeal to the buyer, whereas discounts would be a constant stimulus to buyers to order in larger quantities. Thus the producers' problem of equitably distributing the cost of handling small orders would be solved.—Page 1607.

Successfully casts 15,000 lb. bronze ingots. Naval Gun Factory finds that metal up to the base of the sink head can be used. Drossy metal on surface of ingot is machined off corrugated ingot, without loss of sound metal, by special attachment on lathe.—Page 1579.

Steel production declined sharply in November. Average daily rate of ingot output was 119,299 tons, 5.7 per cent below October. November production was smallest since July, 1925. —Page 1609.

Saves 42 per cent by heat-treating small forgings electrically. When oil was used the heat-treating cost $13.63 per ton, while now it is done for $7.83, wrench manufacturer reports.—Page 1585.

Foundry is kept free of gas and smoke by running mold conveyor through a closed hood fitted with an exhaust system. Castings are then conveyed directly to a cooling conveyor.—Page 1583.

Spare the oil and spoil the machine. It pays to take particular pains to instruct the new operator in the lubricating of his machine. And in addition, have the foreman make regular inspections for a few weeks to see that the oiling is properly done.—Page 1587.

Small plants get benefit of medical service for employees by uniting with larger plants in establishing joint "health unit." Each unit accommodates 1000 workers. A full-time nurse and a part-time physician are engaged.—Page 1588.

Machine tools are kept out of the repair shop by making a thorough inspection when a breakdown occurs. Instead of merely repairing the break, the cause should be ascertained and the weakness remedied.—Page 1587.

"Brass founders' ague" affects 60 per cent of exposed workers in plants investigated. Zinc oxide fumes and poor ventilation are the causes ascribed by insurance company investigators. —Page 1601.

Cuts inventory 58 per cent by drastic reduction in styles of parts carried in stock. Machinery builder discovers that simplification can be practiced with no ill effects, and with good results in the form of a considerable saving in money, storage space and time.—Page 1602.

Only one-fourth as much pig iron imported in first nine months of this year as in same period of 1926. From 394,583 tons imports have dropped to 94,449 tons, of which India has supplied almost one-half.—Page 1600.

Workers help employer save export business by taking share of profits instead of wages. Manufacturer is able to meet lower price offered by foreign supplier. Not only is the business saved, but now profits to workers exceed former wages. —Page 1586.

Small plant can profitably use employee representation. But it is not wise to force the plan upon the workers. Both employer and employee profit by giving the latter the right to confer with the management.—Page 1586.

Finds it pays to photograph gates, sinkheads, etc., on important castings, especially if castings are to be repeated in considerable number. The photographs make it possible to lay out the foundry work so that lost time and waste motion are eliminated.—Page 1593.

ESTABLISHED 1855

THE IRON AGE

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Our Foreign Trade in Steel

MORE attention is given to the fluctuations in our iron and steel imports and exports than to a comparison between the foreign trade and the domestic trade. Both our exports and our imports are important as illustrating trends, rather than as constituting any large portion of the total business we transact.

Steel production has been remarkably steady since July 1, and imports and exports have shown less variation than they frequently do, so that a close comparison, well up to date, can be made of the tonnages. It turns out that in the four months, July to October inclusive our steel exports represented 6 per cent of our steel production and the imports less than 2 per cent. Imports and exports of semi-finished steel and rolled and finished steel as reported in THE IRON AGE monthly have been as follows, in gross tons:

	Imports	*Exports*
July	37,089	160,515
August	36,510	141,387
September	49,977	125,960
October	31,463	132,237
Average	38,760	140,025

Considering the degree of finish involved in the individual items, a fair allowance would be that the material represented about 70 per cent of the weight of steel ingots involved in the manufacture. That would make the monthly averages about 55,000 tons of ingots represented by steel imports and 200,000 tons of ingots represented in the steel exports. The monthly average of steel ingots produced was 3,317,000 tons, so that imports represented 1.7 per cent of production and exports 6.0 per cent.

These bare figures show how closely the steel producers of the United States are pressed by foreign competitors. So large an industry is able to seek export trade intelligently and bear the overhead expense, and in the circumstances 6 per cent is a very low proportion. A large part even of the 6 per cent is trade with nearby countries, particularly Canada, which does not really count as an indication of our general ability to secure overseas business.

Then as to imports, while 1.7 per cent seems small, it is remarkable that any foreign steel at all gets into the country when the domestic makers are in such close touch with consumers and hand-to-mouth buying is so rigidly prosecuted.

Steel producing costs are high in the United States. The fact is well known and is merely illustrated by the import and export statistics. The manufacturing practice is very good, in many respects altogether superior to that of foreign competitors, but wages are high, rail freights count for a great deal, and equipment is expensive. The return on the capital investment is very low.

Is Your Foundry Ventilated?

A BULLETIN from the United States Public Health Service (reviewed on page 1601) discusses the old problem of brass founders' ague. In view of the more frequent recurrence of this disease during winter months, it is timely to give the matter serious consideration.

Only because zinc oxide poisoning is a mild industrial disease with no damaging after effects have the brass foundries so far been free from interference by public health authorities. But that is no excuse for the industry, especially since it is well known that adequate ventilation of the premises is all that is necessary to curtail sharply the number of recurrent attacks to susceptible workmen. It is a short sighted manager who rests content with the thought that the molders seldom are so sick the following day that they stay at home. Even though a man may be able to come to work after a bad attack of the ague, unquestionably his energy is low, his interest in life is dull—he is just putting in time.

No one is telling a secret when he says that many foundries are dusty, dirty places, poorly lighted and worse ventilated. In fact, such conditions are frequently blamed for the difficulty in recruiting desirable young men for apprentices. If we add to such surroundings the depressing feeling

of a day after a hard night with "oxide chills," then one workman's morale at least will be particularly low.

Money spent for more light and fresh air will pay for itself in many and devious ways. The better sanitary conditions existing in recently built foundries is proof that progressive managers recognize this fact. But it isn't necessary to wait until the old plant can be scrapped and a new one built. A window cleaner, some generous hoods, some roof ventilators, and a few exhaust fans will do wonders.

Quantity Differentials in Steel

MAKERS of hot rolled steel and the more finished steel commodities have been giving no little thought lately to quantity differentials. Some action has been taken, but the subject must be considered in an infant stage if the sweeping change that has occurred in the buying and selling of steel products is recognized. A great deal will have to be done to put the marketing on a fair basis.

There were times before the war when 80 to 90 per cent of all the steel shipped was on contract. Naturally buyers made up specifications in large lots, for their own convenience, but this was also a great convenience to mills, conducing to low costs and large outputs. Now the condition is absolutely reversed.

This is a stupendous change, and it should be obvious that no easy and simple remedy is to be applied. It is a case of establishing quantity differentials, but that is a broad subject. In the first place it must be decided whether the quantity concept shall be that of the buyer's annual requirements or the amount ordered to be shipped at one time. In the second place, it has to be decided whether the differential shall be an extra or a discount. Even then only the rudiments have been settled.

The great principle insisted upon by the buyer is that he shall be placed on equal terms with his competitor. The smaller consumer will not admit it is fair to ask him to wait until he becomes large to be given the preferential. He will ask how he can become large if he is thus handicapped. The objection applies much less if the quantity differentials be upon the amount of a given size in the specific order. The smaller buyer can be asked to look a little further ahead, and he must admit the reasonableness of a mill's claim that it costs more to ship a small lot than a large lot. The mill cannot equally claim that many small lots shipped to one buyer in the course of a year cost less than the same number of small lots shipped to a dozen or a hundred buyers in the year.

The question of whether the differential should be a discount or an extra is purely a practical matter of marketing, of how one system or the other would actually work. By experience over many years the steel trade found that in various lines preferentials could be given to the largest and most desirable trade without general market disturbance, and that experience is not to be dismissed lightly, although it has to be recognized that there is much more publicity nowadays. The practical difficulty is that quantity differentials must be clear-cut and must be published to the trade at large, which was not the case with the old preferentials. Still, discounts thus openly offered would be a constant stimulus to buyers to order in larger quantities. A list of quantity extras does not appeal to the buyer, but extras for size, finish, etc., are fully in vogue.

To make the differential apply to a given quantity of any size or description ordered at one time is simple, but obviously cannot avoid being a misfit on many sizes or descriptions, for some sizes run into very much greater weights than others. When there are already extensive lists of extras according to character or section it would seem logical and reasonably simple to add one or more columns giving the quantity of the size to which the differential would apply. A thousand pounds might be fair on one size and ten thousand pounds on another.

Ingots and Pig Iron in 1927

PRODUCTION of steel ingots this year will put 1927 in the fifth place in point of tonnage. If the average for December is at the November daily rate of 119,300 tons, the total ingot output for the year will be about 43,270,000 gross tons. This will be less than the figures for 1926, 1925, 1923 and 1917. If the December figure shows a continuation of the downward tendency of November, and reaches as low as 115,000 tons a day, the year's output, at 43,150,000 tons, will still exceed that of 1918, which now stands fifth. The drop from November would have to be nearly 8000 tons a day to bring the year below 1918.

But 1927 will not stand so high as a pig iron year. With only one month yet to hear from, and no clear indication that that will exceed November, a total of about 36,185,000 tons is indicated. This is the eighth in point of size, having been exceeded by 1916 and by every year in the succeeding decade excepting 1919, 1921, 1922 and 1924. Only in the event that December production exceeds that of November by 250,000 tons, or better, will any of the seven high years be displaced by this year. Both 1920 and 1925 had a total between 36,400,000 and 36,415,000 tons. An unexpected upturn in December might put this year in sixth position, but this is outside the realm of probability.

Latin America Our Best Customer

FIGURES showing the amount of trade enjoyed by the United States with the republics to the south (so-called Latin America) in comparison with the value of the commodities going to them from Great Britain, France and Germany have just been issued by the National Foreign Trade Council. On the whole, these comparisons are quite encouraging. Whereas we sent South America only one-tenth of her imports in 1890, and one-sixth of them before the war, over one-fourth was placed with us in 1925. An even more gratifying share of the trade with the republics north of the isthmus comes to us—approximately two-thirds. This preponderance is responsible for the result that our total shipments to all Latin America (valued at about $900,000,000 in 1925) are approximately $100,000,000 greater than the Latin-American imports from Great Britain, France and Germany combined.

Analysis of the figures for each of the 20 different countries indicates that the business which fell our way during and after the war has not only been retained, but is being increased at a healthy rate, both in gross value and in percentage of the total. O. K. Davis, secretary of the National For-

eign Trade Council, believes this is due to the five billion dollars of American capital which has entered these countries (one-third into Cuba, one-third into Central American countries, and one-third into South America), to the improved steamship services and the Panama Canal, to the improved cable connections, and to the better understanding of Latin-American customs by American exporters.

These changes are no less important to the American citizen than to the metal working and machine industries. When one-fifth of our entire exports now finds a market in republics to the south of us, and when our investments there and loans to them are increasing many millions a year, it is essential to improve by every reasonable effort that feeling of good will which is the best basis of enduring trade, and without which all sorts of business and political misunderstandings can arise.

Secretary Davis and Arbitration

DISCUSSING the work of the Conciliation Service during the past year, Secretary of Labor James J. Davis comes out flat-footed in opposition to compulsory arbitration of labor disputes:

> Our experience has proved that American employers and employees are not favorable to the principle of compulsory arbitration in labor disputes. In fact, there is a general reluctance among our people to setting up any machinery which would have arbitrary power to prescribe an ironclad basis for the settlement of any differences between employers and workers; and they themselves are in most cases opposed to surrendering their rights and authority to a third party in matters which should be subject to arrangement between themselves. Neither legal enactment nor compulsion seems to be practicable and proper as a means of bringing about industrial peace. The remedy lies not in governmental or other interference between employer and employee, but rather in direct negotiation and mutual understanding.

The 1927 record of the Conciliation Board, as contained in the report, does not make Secretary Davis's argument convincing. "Out of 545 trade disputes handled by the board," he sets forth, "395 were adjusted, 69 were closed without assistance from the commissioners, or were called off or settled with the assistance of local or State agencies, and 57 disputes are listed as 'unable to adjust.'"

The people as a whole have no deep interest in what kind of measures should be taken in a labor dispute, so long as the costly and unpleasant results do not extend so far as to take them in. A strike is always unfortunate, they know, and conciliation as urged by Secretary Davis is a very useful agency in a majority of cases. But there is that other class of labor troubles, well exemplified by the coal strikes of recent years, where millions of people are compelled to share in the inconveniences and losses and even the sufferings which come because one party to the controversy or the other, or both, refused to submit their quarrel to arbitration and get to work again. The Board of Conciliation's 57 disputes labeled "unable to adjust" might include a coal strike or a strike on a railroad or other public utility, in which the people, by no choice of their own, are involved in the issue. In such cases the State should have the right to step in and compel arbitration without cessation of operations.

The Cartel Crisis in Europe

CABLED reports that the collapse of the European steel syndicate is threatened, in view of some serious differences that have developed over quotas, may be taken with salt. It is quite the habit of cartels, whether international or limited to producers in a single country, to be fairly in the throes of dissolution on the eve of such a meeting as is appointed for Friday at Brussels. Nor is it new for Belgium, notwithstanding that its steel output is less than one-sixth of the combined production of Germany and France, to be vociferous in announcing that unless material concessions are made to its demands for increased allotments its further cooperation would be out of the question. Belgian steel-making costs, labor costs in particular, are below those of Germany and France, and German producers will be further handicapped by their Government's insistence on a return to the eight-hour shift on Jan. 1. Further, in view of its relatively small home consumption, Belgium has been an especially active competitor in other European markets, notably in Great Britain, and in shapes and bars has had the lion's share of European shipments to the United States in the past year. If these large exports have entailed heavy payments to the syndicate's treasury, at the rate of $4 a ton for shipments beyond the quota, it is understandable that Belgian producers are pushing for a larger allotment for the coming year, but that is by no means equivalent to saying that the issue actually menaces the life of the entente. Crises quite as serious, measured by the vehemence of the threatening, have been met and passed before.

CORRESPONDENCE

The Case of the Gray Iron Foundry

To the Editor: I note your editorial of Nov. 17, "Foundries Can Help Themselves," also the statement that from many sources comes information about unsatisfactory business conditions, and that despite a widespread adoption of labor saving machines the margin between operating cost and gross income is too small.

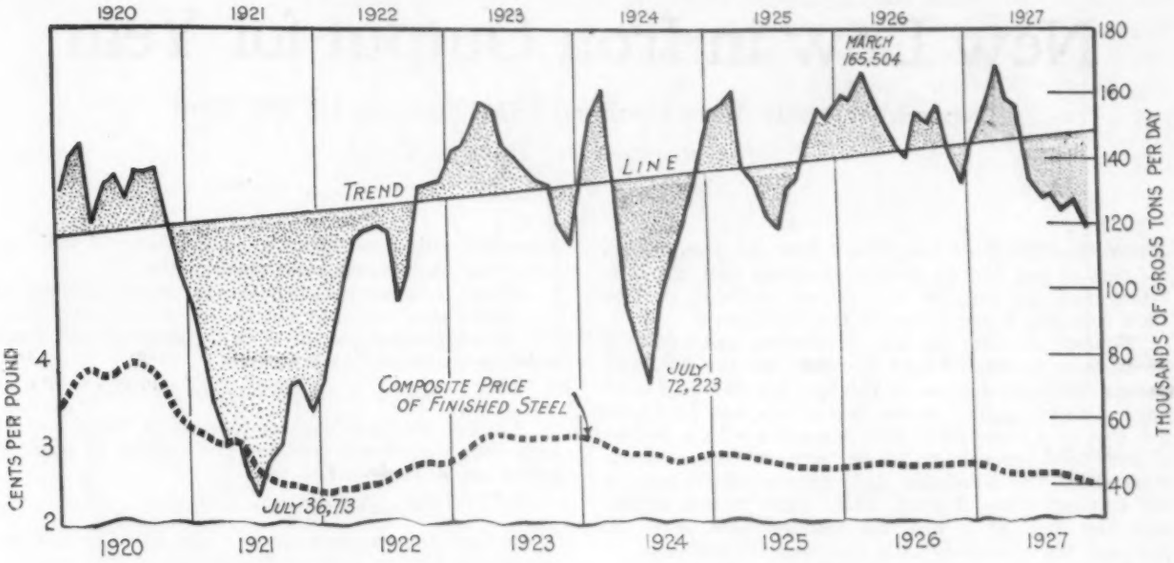
It occurs to me that possibly supply and demand explains the lack of business in gray iron castings, rather than the suggested substitutes such as steel castings, malleable castings, die castings, and stampings, each of which has its field, as does gray iron. The smallness of the margin between operating cost and gross income is probably due to not scheduling the class of castings, production arrived at, overhead added, and then margin of profit. Such accounting eliminates the practice of quoting flat prices (where one class of castings affords a profit and another a loss) and also the generally accepted policy of having accounts on which a profit is realized, and seeking other accounts which offer only the possibility of overhead contribution. For one to seek such accounts means that they must be taken from other founders who have secured a margin of profit on them, and so on; when the circle is completed there is no profit left.

Possibly a little consideration to the above may go a long way toward eliminating the questionnaire nuisance and yield better results to the gray iron foundry industry.

NORTH WALES MACHINE CO., INC.
J. W. King, Treasurer.

North Wales, Pa., Dec. 3.

Production of Steel Ingots in November Showed a Sharp Drop from October, Carrying It Still Further Below the Line Representing the Calculated Trend of Consumption



Sharp Decline in Ingot Production

Daily Rate of 119,299 Tons Was 5.7 Per Cent Below October—Eleven Months, 7.5 Per Cent Under Last Year

PRODUCTION of steel ingots in the United States in November is calculated by the American Iron and Steel Institute at 3,101,764 gross tons. This is based on returns from companies which in 1926 produced 95.40 per cent of the total tonnage. With 26 working days, the November production was 119,299 tons a day. This is the lowest figure for daily output since July, 1925. It compares with 126,500 tons in October, and with 142,529 tons a year ago.

For the 11 months which have elapsed so far during the year, the calculated monthly output is given by the institute at 39,890,571 gross tons, or an average of 139,967 tons a day. This represents a decline of 8.2 per cent below the calculated figures for 11 months last year, which stood at 43,469,439 tons, or an average of 152,524 tons a day. This drop is reduced to 7.5 per cent when allowance is made for the electric and crucible ingot tonnage, which no longer is reported by the institute, but which was reported in last year's figures.

Bessemer steel in 11 months showed a decline of 10.6 per cent; open-hearth steel, of 6.9 per cent. In November the loss was still sharper: Bessemer steel was 18.6 per cent below November, 1926; open-hearth steel, only 15 per cent.

Estimating production in November of electric and crucible steel ingots at 700 tons a day, the November total would appear to be about 120,000 tons a day. This is nearly 16 per cent under the figure for November, 1926. Details of the past 23 months are shown in the table.

Production of Steel Ingots

(Gross Tons)

Months	Reported by Companies Which Made 95.40 Per Cent of the Steel Ingots in 1926		Calculated Monthly Production All Companies	Approximate Daily Production All Companies
	Open-Hearth	Bessemer		
1927				
Jan.	3,041,233	545,690	3,759,877*	144,611*
Feb.	3,042,232	565,201	3,781,376*	157,557*
March ..	3,701,418	590,716	4,499,092*	166,633*
April ...	3,340,852	565,634	4,094,849*	157,494*
May	3,272,810	557,683	4,015,192*	154,430*
June ...	2,822,477	486,047	3,468,055*	133,387*
July	2,595,692	436,446	3,178,342*	127,134*
Aug.	2,805,657	505,584	3,470,903*	128,552*
Sept. ...	2,611,976	471,455	3,232,108*	124,312*
Oct.	2,641,920	495,798	3,289,013*	126,500*
Nov.	2,477,253	481,830	3,101,764*	119,299*
11 Months	32,353,520	5,702,084	39,890,571*	139,967*
1926				
Jan.	3,326,846	581,683	4,132,210	158,931
Feb.	3,023,829	556,031	3,785,051	157,710
March ..	3,590,791	635,680	4,468,617	165,504
April ...	3,282,435	601,037	4,105,799	157,915
May	3,201,230	516,676	3,927,979	151,076
June ...	3,036,162	498,764	3,734,153	143,621
July	2,911,375	526,500	3,634,993	139,807
Aug. ...	3,145,055	627,273	3,986,966	153,345
Sept. ...	3,089,240	612,588	3,913,383	150,515
Oct.	3,224,584	630,526	4,074,544	156,713
Nov.	2,915,558	592,239	3,705,744	142,529
11 Months	34,747,105	6,378,997	43,469,439	152,524
Dec.	2,788,479	493,172	3,466,766	133,337
Total ...	37,535,584	6,872,169	46,936,205	150,920

*Excluding crucible and electric steel ingots.

To Open Shipbuilding Plant

The Dravo Contracting Co., Pittsburgh, will open a shipbuilding and assembling plant in Wilmington, Del., with a frontage of 878 ft. on Christiana River. It then will be in a position to make seaboard deliveries at New York, Philadelphia and Baltimore, with the added advantage of deliveries via the intracoastal canal. The new plant will cover approximately 6½ acres and will be devoted to the building of steel barges and floating equipment. The construction of 10 steel barges for the Arundel Corporation, Baltimore, for which the company took the order several weeks ago, will take place at the new plant.

New Government Specifications for Pipe Fittings, Nails, etc.

The United States Government has issued new master specifications, adopted by the Federal Specifications Board, governing purchases of malleable iron pipe fittings (specification No. 535); nails, spikes, tacks and staples (specification No. 534), and zinc plates, sheets and strips (specification No. 531). These became effective Nov. 23.

Ten of the plants of the American Sheet & Tin Plate Co., employing a total of 5321 men, went through October without a lost time accident and nine plants, employing 6855 men each, had only one lost time accident.

New Low in Iron Output for Year

November Daily Rate Declined 1531 Tons or 1.7 Per Cent from October—Net Loss of Only Two Furnaces

COMPILATION of the actual data for the production of pig iron in November shows that the estimates made by wire on Nov. 29, as published in THE IRON AGE Dec. 1, were close to the real figures.

November's total pig iron production was 2,648,376 gross tons, or 88,279 tons per day for the 30 days, against 2,784,112 tons, or 89,810 tons per day, for the 31 days in October. The decline last month was 1531 tons per day, or 1.7 per cent. This compares with a decline of 2688 tons per day, or 2.9 per cent, in October from November. The November daily rate of 88,279 tons is the smallest since August, 1925, when it was 87,241 tons per day. It is also the smallest this year. A year ago the November daily rate was 107,890 tons.

For the 11 months ended with November the production has been 33,536,551 tons, as compared with 35,979,410 tons to Dec. 1, 1926, and 33,153,022 tons to Dec. 1, 1925.

Net Loss of 2 Furnaces

Five furnaces were shut down and 3 were blown in during November—a net loss of 2 for the month. This compares with a net loss of 7 in October and with net losses for each month since April, inclusive.

Of the 5 furnaces shut down last month, 3 were independent steel company stacks and 2 were merchant. The Steel Corporation blew in 2 furnaces and there was one merchant stack started.

Possibly Active Furnaces Reduced

The two Dunbar furnaces in western Pennsylvania have been torn down, reducing the number of possibly active stacks from 361 to 359.

Capacity Active on Dec. 1

On Dec. 1 there were 170 furnaces blowing as compared with 172 on Nov. 1. The estimated daily rate of the 170 furnaces was 87,700 tons per day; the 172 furnaces on Nov. 1 had an estimated operating rate of 88,300 tons per day.

Manganese Alloy Output

Ferromanganese output in November was 17,851 tons, or slightly more than the October production of

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchants*	Total
October, 1926	83,188	24,365	107,553
November	82,820	25,070	107,890
December	74,909	24,803	99,712
January, 1927	75,609	24,514	100,123
February	80,595	24,429	105,024
March	86,304	26,062	112,366
April	87,930	26,144	114,074
May	84,486	24,899	109,385
June	78,110	24,878	102,988
July	69,778	25,421	95,199
August	71,413	23,660	95,073
September	69,673	22,825	92,498
October	66,991	22,819	89,810
November	64,600	23,679	88,279

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	Nov. (30 days)	Oct. (31 days)	Sept. (30 days)	Aug. (31 days)
New York and Mass.	212,778	232,422	222,485	231,625
Lehigh Valley	75,748	81,829	86,398	88,451
Schuylkill Valley	53,269	64,260	52,256	37,284
Lower Susq. and Lebanon Valleys	30,150	31,828	30,349	31,244
Pittsburgh district	495,005	540,525	555,384	580,459
Shenango Valley	64,752	77,106	83,919	98,687
Western Penna.	92,000	93,010	91,774	96,833
Maryland, Virginia and Kentucky	91,300	88,991	80,973	95,528
Wheeling district	110,055	110,222	114,357	130,065
Mahoning Valley	223,617	245,625	248,834	265,726
Central and Northern Ohio	306,395	324,793	311,141	327,703
Southern Ohio	32,750	32,954	25,636	27,046
Illinois and Indiana	508,545	506,438	533,686	572,623
Mich., Minn., Mo., Wis., Colo. and Utah	126,287	121,203	122,309	140,069
Alabama	219,478	224,533	207,363	212,337
Tennessee	6,247	8,373	8,085	11,596
Total	2,648,376	2,784,112	2,774,949	2,947,276

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1923—Gross Tons

	1923	1924	1925	1926	1927
Jan.	104,181	97,384	108,720	106,974	100,123
Feb.	106,935	106,026	114,791	104,408	105,024
Mar.	113,673	111,809	114,975	111,032	112,366
Apr.	118,324	107,781	108,632	115,004	114,074
May	124,764	84,358	94,542	112,304	109,385
June	122,548	67,541	89,115	107,844	102,988
½ year	115,147	95,794	105,039	109,660	107,351
July	118,656	57,577	85,936	103,978	95,199
Aug.	111,274	60,875	87,241	103,241	95,073
Sept.	104,184	68,442	90,873	104,543	92,498
Oct.	101,586	79,907	97,528	107,553	89,810
Nov.	96,476	83,656	100,767	107,890	88,279
Dec.	94,225	95,539	104,853	99,712	.....
Year	109,713	85,075	99,735	107,043	.....

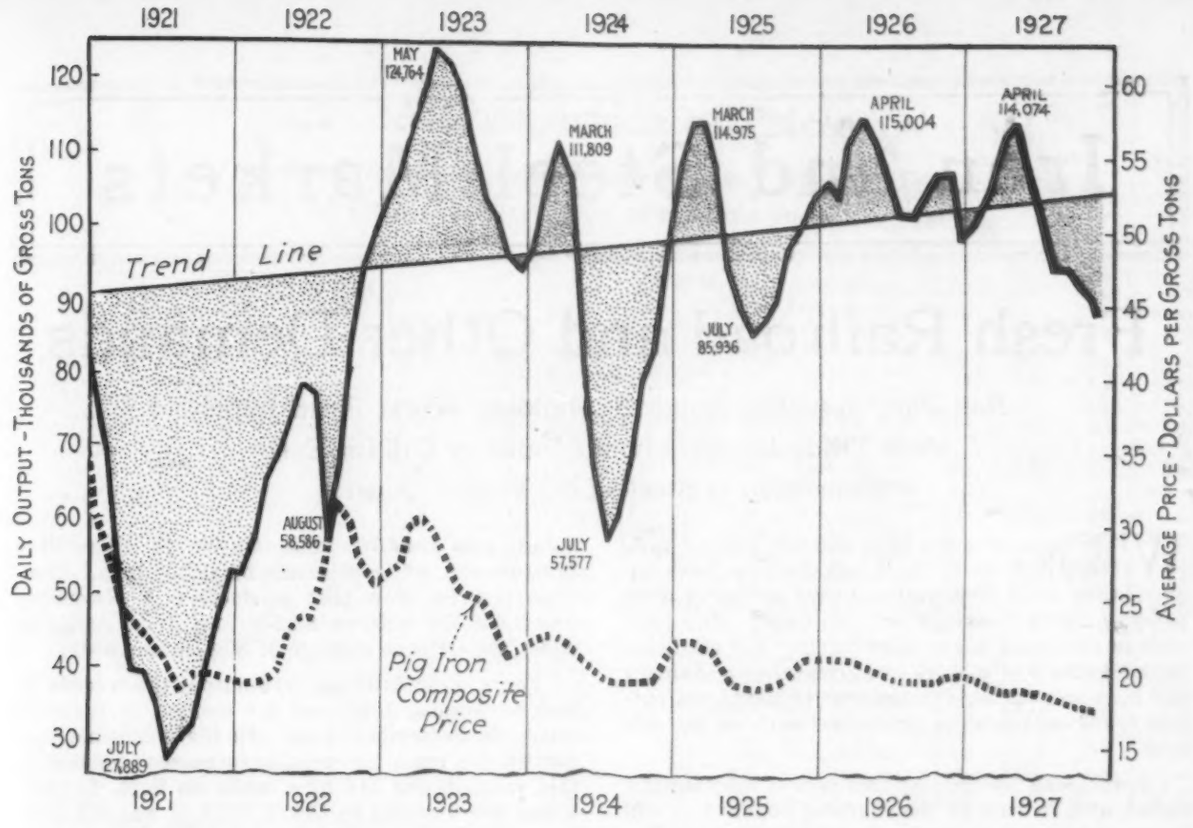
Coke Furnaces in Blast

Furnaces	Total Number of Stacks	Dec. 1 Number in Blast	Dec. 1 Capacity per Day	Nov. 1 Number in Blast	Nov. 1 Capacity per Day
New York:					
Buffalo	21	14	6,250	14	6,375
Other N. Y. and Mass.	6	2	835	2	785
New Jersey	3	0	....	0	....
Pennsylvania:					
Lehigh Valley	11	4	2,070	5	2,440
Spiegeleisen	2	1	200	1	195
Schuylkill Valley	12	4	1,475	5	2,070
Susquehanna Valley	4	2	940	2	960
Ferromanganese	1	1	65	1	65
Lebanon Valley	0	0	....	0	....
Ferromanganese	2	0	....	0	....
Pittsburgh District	51	27	16,500	26	16,180
Ferro. and Spiegel.	4	2	335	2	345
Shenango Valley	13	4	1,830	5	2,480
Western Pennsylvania	16	6	2,860	6	2,870
Ferromanganese	2	1	195	1	130
Maryland	5	5	2,310	5	2,270
Ferromanganese	1	0	....	0	....
Wheeling District	13	6	3,660	6	3,550
Ohio:					
Mahoning Valley	26	12	7,450	12	7,570
Central and Northern	23	17	10,210	18	10,675
Southern	13	4	1,100	4	1,060
Illinois and Indiana	44	27	17,170	26	15,595
Mich., Wis. and Minn.	12	7	2,850	6	2,440
Colo., Mo. and Utah	7	3	1,290	3	1,240
The South:					
Virginia	14	1	235	1	235
Ferromanganese	1	0	....	0	....
Kentucky	5	1	360	1	360
Alabama	34	18	7,310	18	7,200
Ferromanganese	1	0	....	0	....
Tennessee	12	1	200	2	210
Total	359	170	87,700	172	88,300

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1925—Gross Tons

	1925	1926	1927
Jan.	3,370,336	3,316,201	3,103,820
Feb.	3,214,143	2,923,415	2,940,679
Mar.	3,564,247	3,441,986	3,483,362
Apr.	3,258,958	3,450,122	3,422,226
May	2,930,807	3,481,428	3,390,940
June	2,673,457	3,235,309	3,089,651
½ year	19,011,948	19,848,461	19,430,678
July	2,664,024	3,223,338	2,951,160
Aug.	2,704,476	3,200,479	2,947,276
Sept.	2,726,198	3,136,293	2,774,949
Oct.	3,023,370	3,334,132	2,784,112
Nov.	3,023,006	3,236,707	2,648,376
11 months	33,153,022	35,979,410	33,536,551
Dec.	3,250,448	3,091,060	.....
Year*	36,403,470	39,070,470	.....

*These totals do not include charcoal pig iron. The 1926 production of this iron was 163,880 tons.



Daily Pig Iron Output in November was 1.7 Per Cent Less Than in October; Composite Price Again Decreases Slightly

Inclined line represents the gradually increasing theoretical needs of the country, and shows that production is now below the so-called normal. Dotted line represents THE IRON AGE *composite price*

17,710 tons. The spiegeleisen output last month was 6521 tons, comparing with 6129 tons in October.

Furnaces Blown In and Out

During November only three furnaces were blown in and only five blown out. The three furnaces which were blown in were one Clairton furnace of the Carnegie Steel Co. in the Pittsburgh district; one South Chicago furnace of the Illinois Steel Co. in the Chicago district, and one Detroit furnace of the M. A. Hanna Co. in Michigan. The five furnaces which were blown out were two Bethlehem Steel Corporation stacks, one at the Bethlehem plant in the Lehigh Valley and one at the Coatesville plant in the Schuylkill Valley, the Claire furnace in the Shenango Valley, the United furnace of the Central Alloy Steel Corporation and the Rockdale furnace in Tennessee.

Production of Steel Companies for Own Use—Gross Tons

	Total Iron Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
			1926		1927	
	1926	1927	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan.	2,599,876	2,343,881	29,129	7,746	31,844	7,486
Feb.	2,272,150	2,256,651	22,309	7,084	24,560	7,045
Mar.	2,661,092	2,675,417	24,064	7,339	27,834	7,650
Apr.	2,677,094	2,637,919	24,134	7,051	24,735	12,907
May	2,687,138	2,619,078	23,159	6,999	28,734	9,788
June	2,465,583	2,343,409	25,378	5,864	29,232	10,535
½ year	15,362,933	14,876,355	148,173	42,083	166,939	55,411
July	2,461,161	2,163,101	26,877	3,699	26,394	9,350
Aug.	2,424,687	2,213,815	23,557	4,372	21,279	9,104
Sept.	2,436,733	2,090,200	25,218	2,925	20,675	6,037
Oct.	2,578,830	2,076,722	28,473	6,295	17,710	6,129
Nov.	2,484,620	1,938,043	31,903	7,565	17,851	6,521
Dec.	2,322,180	.....	31,627	7,157	....	....
Year	30,071,144	.....	315,828	74,096	....	....

*Includes output of merchant furnaces.

International Cast Iron Pipe Agreement Denied

That American cast iron pipe producers have been approached by European makers with the object of forming an international cartel or making an agreement as to prices and markets is the substance of a report cabled from Paris in the past week. Denials have come from makers both in France and the United States.

Mentioned in the report was the Centrifugal Pipe Corporation, which controls the patent rights to the De Lavaud process of casting pipe centrifugally. There are some licensees under this process among Continental pipe makers, including the Gelsenkirchen Bergwerks, Düsseldorf, Germany. As other license negotiations are understood to have been in progress recently, the opinion is expressed that the report of an international agreement may have developed from this situation.

Chateaugay Iron Company To Make Steel Castings

The Chateaugay Ore & Iron Co., Lyon Mountain, N. Y., is completing the erection of a small steel castings plant at Standish, N. Y., the site of the company's blast furnace. The company has been making experimental castings for some time and will probably enter into commercial production soon after the first of the year. Among its first products will probably be cast steel car wheels.

The Chateaugay Ore & Iron Co., which is a subsidiary of the Delaware & Hudson Co., operates one blast furnace at Standish, N. Y., with an estimated annual capacity of 109,500 tons of low phosphorus pig iron. Ore is obtained from the company's mine at Lyon Mountain.

Iron and Steel Markets

Fresh Railroad and Other Demands

Rail Purchases, Car Inquiries, Building Work, Farm Implement Trade and Automobile Industry Call for Early Expansion in Steel—Low Fourth Quarter

WITH sales of more than 260,000 tons of rails in the past week, the appearance of fresh inquiries for some 6000 railroad cars on top of 4000 pending, with bookings of fabricated structural steel in continued heavy total volume, and with sustained activity of makers of agricultural machinery and heavier shipments to automobile plants, the outlook is for expansion in production early in the new year.

Purchasing for delivery this year is substantially ended, and, in view of the year-end holidays, it will be surprising if December output will equal November. Meanwhile, buying for delivery in the first quarter as yet remains moderate, with acceptance of the 1.80c., Pittsburgh basis, for the heavy tonnage products, and some forward covering of sheets at the recently ruling levels.

An announcement by several makers of sheets of an advance of $1 to $4 a ton, according to grade, for first quarter delivery is not finding a spontaneous response among other producers. Apparently sufficient business had already been closed to cause them to await assurances that the new prices will stand the test of present relations of supply and demand.

Next season's tin plate price of $5.25 a base box at Pittsburgh and $5.35 at Elwood and Gary, Ind., is a reduction of 25c., the first of the kind in four years. Smaller discounts than in the past will be allowed large buyers.

Wire mills generally have adopted the new card of extras on nails, making, with the higher base price, an average advance of some 5c. a keg. While now effective, buying under the new scale will be a first quarter matter.

Another price test comes in the naming of a minimum of 2.20c., Pittsburgh, on cold finished steel bars for ordinary tonnages for next year. With definite reductions for large quantities but using the latest card of extras, makers are looking for a better net return.

November production of steel ingots, amounting to 3,120,000 tons, when electric and crucible steels are included, proved to be about 6 per cent below October. With December unlikely to exceed November, the fourth quarter steel output will be under the third quarter by probably the same percentage. The four quarters of the year, in order, will line up, in percentages of capacity engaged, as follows: 85, 82, 69½ and 65. The fourth quarter output last year represented 80½ per cent of capacity.

In pig iron activity, the country began December with 170 furnaces in blast, making pig iron at a daily rate of 87,700 tons. On Nov. 1, there were 172 furnaces active at a rate of 88,300 tons. Complete returns show that production in November was 2,648,376 tons, or 88,279 tons a day, slightly under the October average of 89,810 tons a day.

For a lower daily pig iron output the records go back to August, 1925, and for number of furnaces active, to September, 1924. In the meantime production per stack has greatly increased; on Dec. 1, this year, it was 516 tons, while on Sept. 1, 1925, it was 455 tons and on Oct. 1, 1924, it was 418 tons.

The rail business closed includes 94,000 tons for the Southern Pacific, 90,000 for the Baltimore & Ohio, 50,000 for the St. Paul, 9500 for the Grand Trunk and 5000 for the Monon. For a Chinese road in Manchuria, the Steel Corporation booked 11,000 tons of 80-lb. sections.

Railroad car inquiries include 2450 from the Southern, 2150 from the Louisville & Nashville, and 1000 from the Texas & Pacific, together with several large lots of underframes. The Southern will buy also 38 locomotives.

In structural steel, Canadian work figures largely. Three projects in Toronto call for 28,000 to 33,000 tons, while an award in Montreal is for 5000 tons. Buildings in New York, including 7000 tons for a department store, represent 24,000 tons of the 38,000 tons booked.

Pig iron buying is active at Cleveland, where sales of foundry and malleable grades totaled 50,000 tons, and in the St. Louis district, where 27,000 tons, much of it basic, was booked. Nearly all of the iron sold at Cleveland was for first quarter delivery. Interest in 1928 requirements is slow in developing in other sections. Prices still show a soft tendency at Pittsburgh, where Bessemer iron has declined 25c. a ton and basic iron is available from nearby stacks at delivered prices 50c. a ton below those from Valley furnaces.

Scrap, following the recent advances on heavy melting steel at Pittsburgh, is sentimentally stronger in virtually all market centers. Advances of 25c. a ton on heavy melting grade were registered at Chicago and Cincinnati.

Ferromanganese prices for first half of 1928 have been advanced $10 to $100, seaboard basis. Ferrosilicon, 50 per cent, has been reduced $1.50 per ton to $83.50, and ferrochromium from 11½c. to 11c. per lb. of contained chromium.

Both of THE IRON AGE composite prices remain unchanged this week, that for pig iron standing for a second week at $17.59 a gross ton and that for finished steel for a third week at 2.307c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Dec. 6, 1927	Nov. 29, 1927	Nov. 7, 1927	Dec. 7, 1926
No. 2, fdy., Philadelphia	$19.76	$19.76	$19.76	$23.26
No. 2, Valley furnace	17.25	17.25	17.50	19.00
No. 2, Southern, Cin'ti	19.69	19.69	19.69	23.69
No. 2, Birmingham	16.00	16.00	16.00	20.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	21.00
Basic, del'd eastern Pa.	19.00	19.00	20.00	22.00
Basic, Valley furnace	17.00	17.00	17.00	18.50
Valley Bessemer, del'd P'gh	*19.51*	19.76	19.76	21.76
Malleable, Chicago*	18.50	18.50	18.50	21.00
Malleable, Valley	17.50	17.50	17.50	19.00
Gray forge, Pittsburgh	18.51	18.51	18.76	20.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	**100.00**	90.00	90.00	100.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	36.00
Forging billets, P'gh	38.00	38.00	38.00	40.00
O.-h. billets, Phila.	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh	40.00	40.00	42.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.75	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.07	2.22
Iron bars, Chicago	1.90	1.90	1.85	2.00
Steel bars, Pittsburgh	1.80	1.80	1.75	2.00
Steel bars, Chicago	1.90	1.90	1.85	2.10
Steel bars, New York	2.14	2.14	2.09	2.34
Tank plates, Pittsburgh	1.80	1.80	1.75	1.90
Tank plates, Chicago	1.90	1.90	1.85	2.10
Tank plates, New York	2.14	2.14	2.09	2.24
Beams, Pittsburgh	1.80	1.80	1.75	2.00
Beams, Chicago	1.90	1.90	1.85	2.10
Beams, New York	2.14	2.14	2.09	2.34
Steel hoops, Pittsburgh	*2.20*	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire,	Dec. 6, 1927	Nov. 29, 1927	Nov. 7, 1927	Dec. 7, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.80	3.00
Sheets, black, No. 24, Chicago dist. mill	2.90	2.90	3.00	3.20
Sheets, galv., No. 24, P'gh	3.60	3.60	3.70	3.85
Sheets, galv., No. 24, Chicago dist. mill	*3.70*	3.75	3.85	4.05
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.10	2.30
Sheets, blue, 9 & 10, Chicago dist. mill	2.15	2.15	2.25	2.50
Wire nails, Pittsburgh	2.50	2.50	2.50	2.65
Wire nails, Chicago dist. mill	2.55	2.55	2.55	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh	3.20	3.20	3.20	3.35
Barbed wire, galv., Chicago dist. mill	3.25	3.25	3.25	3.40
Tin plate, 100 lb. box, P'gh	*$5.25*	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$14.50	$14.50	$14.00	$17.00
Heavy melting steel, Phila.	13.50	13.50	14.00	15.50
Heavy melting steel, Ch'go	**11.75**	11.50	11.50	13.00
Carwheels, Chicago	13.25	13.25	13.25	14.50
Carwheels, Philadelphia	15.50	15.50	15.50	16.50
No. 1 cast, Pittsburgh	14.25	14.25	14.25	16.00
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	**14.00**	13.50	13.50	16.00
No. 1 RR. wrot, Phila.	15.25	15.25	15.25	17.00
No. 1 RR. wrot, Ch'go, (net)	**10.25**	9.75	9.50	12.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$3.50
Foundry coke, prompt	3.75	3.75	4.00	4.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**14.12½**	13.75	13.37½	13.75
Electrolytic copper, refinery	**13.75**	13.50	13.25	13.37½
Zinc, St. Louis	*5.85*	5.90	5.65	7.00
Zinc, New York	*6.20*	6.25	6.00	7.35
Lead, St. Louis	**6.37½**	6.10	6.00	7.65
Lead, New York	**6.55**	6.40	6.25	7.90
Tin (Straits), New York	*59.00*	59.12½	56.62½	69.50
Antimony (Asiatic), N. Y.	**11.50**	10.87½	11.00	13.75

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Better Outlook in Steel Market—Tin Plate Price Announced

PITTSBURGH, Dec. 6.—The steel industry is now concerning itself with preparations for a new year, and events of the week have had to do principally with prices for the first quarter of 1928. First has come the announcement of the price of tin plate, which at $5.25 per base box, Pittsburgh, and 10c. higher at Elwood and Gary, Ind., is a reduction of 25c. per box, being quite in line with earlier forecasts but not with the hopes of some of the manufacturers.

Independent wire makers have generally swung into line with the leading producer in adopting a new card of extras on nails, and, while the date of the new card and an advance of 5c. to 10c. per keg in the base price is Dec. 1, application is generally regarded as doubtful before the first quarter. Makers of cold-finished steel bars also are taking a firmer price stand with respect to early 1928 business and have raised prices $2 per ton, in addition to such financial betterments as may be derived from the latest card of extras.

One large sheet maker has announced advances of from $1 to $4 a ton on business for first quarter over prices recently common, but, strange as it may seem in view of the dissatisfaction lately expressed over sheet prices, this move has not found a spontaneous response on the part of other producers. The explanation is that a little too much low-priced business has been booked, which will be an obligation upon first quarter production, for all manufacturers to feel that higher prices can be maintained while the lower-priced material is reaching consuming channels.

Meanwhile there has been no diminution in the belief that the first quarter of the new year will be marked by a rising scale of activity. It is confidently believed that between now and Christmas a very substantial amount of automobile steel tonnage will come out. The trade generally is looking for much structural steel for erection in the spring and summer of next year to reach mill books, and few believe that the coming year will be as lean in railroad steel business as has been this year.

The oil industry appears to have seen its worst, and there is accordingly some hope that there will be a revival with the turn of the new year in oil country pipe. It is practically a unanimous opinion that next year is going to be a good one in tin plate.

Current demands are steady enough, but plainly reflect the desire of consumers to avoid adding to their stocks with the inventory date so near. This means that mill scheduling has been at short range, and it is a fact now, as for some time past, that few steel manufacturers know one day where the next day's mill rolling is coming from. No change is noted in the rate of steel ingot production, but in the Youngstown district there is some tendency toward expansion under the stimulation of somewhat greater orders from motor car builders.

The scrap market is making the most of improved prospects in the steel industry, but consumer interest has not yet reached the stage where it is possible for sellers to add to the advances they recently established. Pig iron is dull and slightly weaker on the steel-making

grades. A reduction of production has been ineffective either in bringing about a balance between supplies of coal and coke and the demand or in giving any real stability to prices.

Pig Iron.—The A. M. Byers Co. is in the market for a good-sized tonnage of a special analysis foundry iron for first quarter delivery to its Girard, Ohio, and Pittsburgh works. Otherwise the market is extremely quiet, and while a few consumers of foundry iron have quietly closed with their regular sources of supply for their first quarter requirements, the majority still holds off. One first quarter tonnage of No. 2 grade has been closed at $17.50, but there does not seem to have been any competition on this order. Since a lower price has been obtained, most melters seem to believe they will do just as well by waiting. The steel-making grades are weaker, and Bessemer iron is quotably lower at $17.75, while $17, the Valley quotation on basic iron, is no longer regarded as anything more than nominal so far as business in the Pittsburgh district is concerned, as this grade is available at $17 at furnaces having a freight advantage over Valley producers of 50c. a ton or more. Indeed, it is reported that sales of this grade have been quietly made at a delivered price of less than $18. W. P. Snyder & Co. make the average price of Bessemer iron shipped from Valley furnaces in November $17.88, compared with $18 the month before, and of basic, $17, the same price as in October.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	$17.75 to 18.00
Gray forge	16.75 to 17.00
No. 2 foundry	17.25 to 17.50
No. 3 foundry	16.75 to 17.00
Malleable	17.50
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Next year's prices on the commonly used ferroalloys have been announced, and the stage now is set for contracting. Ferromanganese has been raised to $100, Atlantic seaboard, guaranteed against a decline, for shipment over the first six months of 1928. Considerable tonnage that will enter consumption during the first quarter of the year will carry a price of $90, the recent market quotation. British producers took some fair-sized tonnages for December shipment just before the announcement of the new price at $90, and there is no doubt that consumers who have requirement contracts will specify rather fully this month to defer paying the higher price as long as possible. There has been a cut in 50 per cent ferrosilicon of $1.50 a ton to $83.50, delivered east of the Mississippi River, this price to prevail for all of 1928, while the contract prices of 20 per cent spiegeleisen range from $30 to $33, furnace, according to the tonnage involved. Most of the contract buyers of the latter already have covered, the new arrangement being merely an extension of old contracts in the case of the large consumers, all of whom had some tonnage due them on 1927 contracts.

Semi-Finished Steel.—Interest in billets, slabs and sheet bars is low and prices are unchanged, largely because non-integrated sheet and strip mills have no attractive tonnages to offer and makers are not pressing for business.

Rails and Track Supplies.—The New York Central Lines will close this week on 20,000 to 30,000 kegs of spikes and for 2,000,000 to 3,000,000 tie plates for delivery over the first half of next year. Otherwise, there is nothing of outstanding interest in track accessories, current demands for which are few and small. The local standard-section rail mill has a good operating schedule, but not much new business for 1928 shipment now remains to be placed. Light-section rails are selling steadily enough, but usually in small lots. Prices show no change.

Tubular Goods.—Standard-weight pipe is moving well for the time of the year, the open weather of the fall having permitted a continuance of building activities much later than usual, but there is not much activity in other classes of tubular goods. A pipe line out of the Amarillo, Tex., field to Omaha is before makers, but the common belief is that it will not be placed before the turn of the new year.

Sheets.—The advance announced by one large producer late last week does not appear to be finding general subscription. This advance, which would put first quarter prices at 2.90c., base Pittsburgh, for black, 3.75c., base, for galvanized and 2.10c., base, for blue annealed, with an extra 10c. per 100 lb. on blue annealed in widths of more than 40 in., is reported to have been adopted by one large Eastern maker, but locally and in Youngstown, makers frankly doubt the effectiveness of the move, seeing that a great deal of first quarter business went into order books prior to the price announcement. Mills in this and nearby districts still regard the market as 2.75c. to 2.80c., base, on black, 3.60c. to 3.65c., base, on galvanized and 2.10c. to 2.15c., base, on blue annealed. It is probable that the proposed width extra on the last named will find common adoption. Prices of more than 4c., base, on automobile body sheets have disappeared. A good first quarter business is being done, but buyers are not so impressed by the advance that has been announced that they are disposed to order out what they have purchased and mill operations are still low.

Tin Plate.—The American Sheet & Tin Plate Co., as of Nov. 30, announced $5.25 per base box, Pittsburgh, and $5.35, Elwood and Gary, Ind., as its prices on standard coke tin plate for the first half of next year to can manufacturers and for the first quarter to jobbers. These prices have been adopted by other makers. They are in line with forecasts, which indicated a reduction of 25c. per base box, based on the lower pig tin and black plate prices, to say nothing of the fact that deviations from the former base prices were rather frequent in the past year. The reduction marks the first change in the base price, which always has been subject to preferentials to large consumers, that has occurred in four years. The price announcement has been followed by a good volume of contracting, but not much increase in mill operations, since January requirements, which now would be working through the mills,

The Iron Age Composite Prices

Finished Steel

Dec. 6, 1927, 2.307c. a Lb.

One week ago	2.307c.
One month ago	2.293c.
One year ago	2.453c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Dec. 6, 1927, $17.59 a Gross Ton

One week ago	$17.59
One month ago	17.54
One year ago	20.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4;	$17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel — *Base Per Lb.*

F.o.b. Pittsburgh mills....1.80c.
F.o.b. Chicago....1.90c.
Del'd Philadelphia....2.12c.
Del'd New York....2.14c.
Del'd Cleveland....1.99c.
F.o.b. Cleveland....1.80c.
F.o.b. Birmingham....1.95c. to 2.05c.
C.i.f. Pacific ports....2.35c.
F.o.b. San Francisco mills....2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills....1.80c. to 1.90c.
F.o.b. Birmingham....2.00c. to 2.10c.

Rail Steel

F.o.b. mills east of Chicago district..1.65c to 1.70c.
F.o.b. Chicago....1.80c.

Iron

Common iron, f.o.b. Chicago....1.90c.
Refined iron, f.o.b. P'gh mills....2.75c.
Common iron, del'd Philadelphia....2.12c.
Common iron, del'd New York....2.14c.

Tank Plates

Base Per Lb.

F.o.b. Pittsburgh mills....1.80c.
F.o.b. Chicago....1.90c.
F.o.b. Birmingham....1.95c. to 2.05c.
Del'd Cleveland....1.99c.
Del'd Philadelphia....2.12c.
Del'd New York....2.14c.
C.i.f. Pacific ports....2.40c.

Structural Shapes

Base Per Lb.

F.o.b. Pittsburgh mills....1.80c.
F.o.b. Chicago....1.90c.
F.o.b. Birmingham....1.95c. to 2.05c.
Del'd Cleveland....1.99c.
Del'd Philadelphia....2.12c.
Del'd New York....2.14c.
C.i.f. Pacific ports....2.40c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.

All gages, 2 in. and narrower, P'gh, 2.20c. to 2.30c.
All gages, wider than 2 in., to 6 in., P'gh, 2.10c. to 2.15c.
*All gages, 6 in. and wider, P'gh..1.85c. to 1.90c.
All gages, narrower than 6 in., Chicago..2.40c.
All gages, 6 in. and wider, Chicago, 2.20c. to 2.40c.

*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

Base Per Lb.

Bars, f.o.b. Pittsburgh mills....2.10c. to 2.20c.
Bars, f.o.b. Chicago....2.20c.
Bars, Cleveland....2.10c. to 2.25c.
Shafting, ground, f.o.b. mill....*2.35c. to 2.80c.
Strips, under 12 in., 1 up to 3 tons, P'gh, 3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland....3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago....3.20c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester....3.25c. to 3.40c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg

Wire nails....$2.50 to $2.55
Galvanized nails....4.50 to 4.55
Galvanized staples....3.20 to 3.25
Polished staples....2.95 to 3.00
Cement coated nails....2.50 to 2.55

Base Per 100 Lb.

Bright plain wire, No. 9 gage....$2.40
Annealed fence wire....2.55
Spring wire....3.40
Galv'd wire, No. 9....3.00
Barbed wire, galv'd....$3.20 to 3.25
Barbed wire, painted....2.95 to 3.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh....$65.00
F.o.b. Cleveland....65.00
F.o.b. Anderson, Ind....66.00
F.o.b. Chicago district mills....67.00
F.o.b. Duluth....68.00
F.o.b. Birmingham....68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. Pittsburgh...2.05c. to 2.15c.
Nos. 9 and 10, f.o.b. Chicago dist. mill, 2.15c. to 2.25c.
Nos. 9 and 10, del'd Cleveland....2.19c. to 2.29c.
Nos. 9 and 10, del'd Philadelphia..2.42c. to 2.47c.
Nos. 9 and 10, f.o.b. Birmingham....2.35c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh....2.70c. to 2.80c.
No. 24, f.o.b. Chicago dist. mill....2.90c.
No. 24, del'd Cleveland....2.94c. to 2.99c.
No. 24, del'd Philadelphia....3.07c. to 3.22c.
No. 24, f.o.b. Birmingham....3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade..3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade..3.75c. to 3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh....3.60c. to 3.65c.
No. 24, f.o.b. Chicago dist. mill...3.70c. to 3.75c.
No. 24, del'd Cleveland....3.74c. to 3.84c.
No. 24, del'd Philadelphia....3.97c. to 4.07c.
No. 24, f.o.b. Birmingham....3.95c. to 4.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh....2.85c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill...3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh....4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes, 4.10c. to 4.20c.

Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills...$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind. 5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.$11.40 | 25-lb. coating I.C.$17.30
15-lb. coating I.C. 14.45 | 30-lb. coating I.C. 18.75
20-lb. coating I.C. 15.80 | 40-lb. coating I.C. 20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		*Base Per 100 Lb.*
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.00 to 4.10
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.00 to 3.10
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.10 to 3.20
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.00 to 4.15
6100	(Chrom. Vanad. spring steel)	3.60 to 3.80
9250	(Silicon Manganese spring steel)	3.00 to 3.15
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.05 to 4.20
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.00 to 4.25
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.05 to 3.10
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

Per Gross Ton

Standard, f.o.b. mill....$43.00
Light (from billets), f.o.b. mill....36.00
Light (from rail steel), f.o.b. mill....34.00
Light (from billets), f.o.b. Ch'go mill....36.00

Track Equipment

Base Per 100 Lb.

Spikes, ⅝ in. and larger....$2.80
Spikes, ½ in. and smaller....$2.75 to 2.80
Spikes, boat and barge....3.10
Tie plates, steel....2.25
Angle, bars....2.75
Track bolts, to steam railroads....3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count, 70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	45	32½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

¼	41	24½	¼ to ⅜	+19	+54
⅜ to ⅝	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1¼ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3⅝ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3½ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base....55
Carbon, 0.30% to 0.40%, base....50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

and those for February shipment, which should be specified in the last two weeks of this month, are usually small.

Hot-Rolled Flats.—Makers are not finding it difficult to secure first quarter tonnages at today's prices, but are getting only a small amount of business against which shipments can be promptly made. There is not much real strength to prices, and even cooperage stock lately has eased off a little, with sales noted at 2.20c., base.

Cold-Rolled Strips.—The market now appears to be fairly steady at 3c., base, for lots of one to less than three tons, with occasional sales to exacting buyers at 3.15c., base. Current demands are light, but a fair amount of first quarter business is being booked.

Wire Products.—Interest centers in the new nail card of extras issued under date of Dec. 1 by the leading producer and since adopted by other manufacturers. The new card constitutes a revision of extras on all standard nails, in which former extras are retained only on barbed dowel pins, large and regular head roofing nails, and smooth foundry nails. Coated nail extras also are outside the scope of the revision. A comparison of the new and old cards discloses that there are no longer any base sizes of standard nails, 20d to 60d nails, which sold at the base price, now being subject to an extra of 25c. per 100 lb. A straight size-and-size comparison indicates an average advance of between 15c. and 20c. per keg, but with a discount of 10 per cent being made on the extras on carloads, whether straight or mixed with other wire products, the increase is somewhat modified and runs even less when the comparison is made between typical orders under the new and old extras. Manufacturers are stressing the point that the discount on the extras applies only on full carloads, and that the extras apply on full carloads even when they are intended for more than one consignee or destination. Extras on coated nails, galvanized nails, and those still sold on the old card also are subject to a discount of 10 per cent on carloads. With the new card, manufacturers are restoring the former base price of $2.55, Pittsburgh or Cleveland. Recently, $2.50 was common here and in some markets $2.45 was the ruling price. The revision is unlikely to take full effect until after the turn of the year, as jobbers generally are covered to the end of this month.

Cold-Finished Steel Bars and Shafting.—Makers are taking a firmer price stand on first quarter business in opening their books for that period. A minimum price of 2.20c., base Pittsburgh or Chicago, is named subject to the extra list dated Oct. 17, and salesmen are being told that no commitments or obligations are to be made below that price. Commitments for the quarter ending this month are not to be extended beyond Dec. 31, and shipments against them must be completed by Jan. 31. The latest card of extras, which has not been effective on business for the last quarter of this year, it is announced, is to be strictly applied on all first quarter business. This means that, on lots of less than 6000 lb., buyers will have to pay an advance of 20c. per 100 lb.; 40c. per 100 lb. more for lots of 1999 to 1000 lb.; 75c. per 100 lb. more for lots of 999 to 500 lb. and $1 per 100 lb. more for lots of less than 500 lb., while on shipments of less than 24,000 lb. there will be an extra of 10c. per 100 lb. The recent advance in hot-rolled bars, with the consequent narrowing of the spread between hot-rolled and cold-finished bar prices, is given as a primary cause for the firmer price position. The market is still quotable from 2.10c. to 2.20c., and business has not yet reflected the stimulation of higher prospective prices.

Bolts, Nuts and Rivets.—Makers are beginning to seek first quarter contracts and are naming the prices which have ruled for the past six months except in the case of large rivets, on which $2.75, base per 100 lb., Pittsburgh or Cleveland, and $2.85, Chicago, are being named without reference to a possibility that the prices later will be raised to those who fail to contract by a definite date. These prices are called large-lot quotations and are to be quoted on business of that sort, whether on contracts or on spot purchases.

Coke and Coal.—No improvement can be reported in the coke or coal markets. Sharp curtailment of Connellsville coke production has not corrected the oversupply of coke, probably because any loss in beehive oven output has been made good by by-product oven production, which is not fully required with a good many steel works furnaces idle. Little or no interest is manifested in first quarter tonnages of furnace coke, and consequently there is no definite idea as to prices for that period. Spot offerings of standard furnace coke are hard to move at more than $2.75, and as low as $2.50 has been done on coke that might pass muster if the furnaces were rushed. Heating coke is almost unsalable. Foundry coke is moving fairly well.

Old Material.—Interest in the trade now is focused on the prices that will be paid on railroad scrap lists. There has been no new consumer buying in this district, and a report that the two largest Youngstown steel companies had bought a large tonnage appears to be without foundation. Heavy melting steel can still be had in Youngstown at $14.50, which does not suggest much desire for supplies among consumers there, who usually have to pay higher than the Pittsburgh price to secure large tonnages. With the close of the Lake shipping season, Youngstown mills expect to get more scrap out of Detroit than they have in the past several months. Prices generally are sustained by light offerings.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.50 to $15.00
Scrap rails	14.00 to 14.50
Compressed sheet steel	13.75 to 14.00
Bundled sheets, sides and ends	12.75 to 13.00
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	14.50 to 15.00
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	14.50 to 15.00
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	11.00 to 11.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.00 to 16.50
Railroad coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.25 to 14.75
Rails 3 ft. and under	15.00 to 15.50
Malleable Grades:	
Railroad	14.50 to 15.00
Industrial	14.00 to 14.50
Agricultural	13.50 to 14.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.20c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count.	62½ per cent off list
Carriage bolts, per 100 count.	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb	$3.50
Wire, black soft annealed, base per 100 lb.	2.90
Wire, galvanized soft, base per 100 lb.	2.90
Common wire nails, per keg	$2.80 to 2.90
Cement coated nails, per keg	2.85 to 2.95

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.80c.
Sheared	1.80c.
Universal	1.80c.

Wire Rods

	Per Gross Ton
*Common soft, base	$40.00 to $42.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is $42 to $43. Cleveland mill base, $40.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c. to 10.50c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.75c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c. to 40c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.50
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	12.00
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75*

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	0.80 to 1.00
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$30.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	135.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	90c. to 93c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagon	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discount of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Railroads Place Heavy Orders for Rails—5600 Freight Cars Under Inquiry

CHICAGO, Dec. 6.—Low stocks in the hands of consumers, a railroad car buying movement that has reached fair proportions, an active list of building projects that augurs well for the early spring months and the added fact that rail rolling schedules are rapidly filling lend encouragement to steel producers. Sustained activity by manufacturers of agricultural machinery and heavier specifications from automobile plants are further indications that the steel production curve will swing upward.

Buyers still move cautiously in regard to the amount of material held in hand, but they are reasonably bold in indicating their anticipated requirements for the early part of 1928. Resistance to prices is stubborn, and is still preventing stabilization in the galvanized sheet and cold-rolled strip markets. Cold-rolled bar manufacturers are attempting to hold prices at 2.20c., Chicago, but this quotation, like the new price on common wire nails, has not yet been tested.

A blast furnace has been added to the active list of steel mill stacks, making the total 21 out of 36 in the district.

Pig Iron.—Sales in the first week in December ran ahead of the corresponding period in November, which was the second largest month of the year. Shipments are lighter, but orders for release at or near the turn of the year lend assurance to producers that the decline in requirements is temporary and due in large measure to the inventory period. Distress boat iron is selling in small lots at $1 below the general market level. Local producers are holding pig iron at $18.50, local furnace, in territory close to Chicago, but to the south and west $18, furnace, is the price commonly named. One seller of boat iron still has 1200 tons on the dock, and it is understood by the trade that one more cargo may arrive at Chicago.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Contracting in ferrosilicon is actively progressing at $83.50, delivered. Purchases for immediate delivery are at $87.50. Domestic producers have advanced ferromanganese $10 a ton to $107.56, delivered. Contracting is slow, and the spot market is dead. Further weakness in spiegeleisen is in evidence, and business in the 19 to 21 per cent grade is being taken at $29 to $30, Hazard, Pa.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 18 to 22 per cent, $36.76 to $37.76.

Cast Iron Pipe.—Low bids at Detroit by domestic producers of pipe were $29, Birmingham, on 5500 tons of 6 and 8-in. Class B and $29.85, Birmingham, on 4000 tons of 24-in. Class C pipe. The freight rate from Birmingham to Detroit is $7.92. B. Nichol & Co. quoted a delivered price of $35.05 for all sizes. It is reported that all bids may be thrown out. These quotations at Detroit are further evidence that producers of pipe are making a strong effort to lift prices. Small tonnages in and around Chicago are going at $30, Birmingham, and $28 is not uncommon on fair-sized orders. Inquiry from public utilities is more active, and several large projects are under way on which pipe may be required in the spring. Various estimates place pipe foundry output at 60 per cent of capacity, and on that basis deliveries range from prompt in a few sizes to 20 or 30 days in others. Cold weather has curtailed pipe laying in much of the North and the Northwest.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $34.70 to $37.20; 4-in., $38.70 to $41.20; Class A and gas pipe, $4 extra.

Plates.—An order for 2000 tons of tankage plates for delivery in the Southwest has been placed with a Western producer. Similar projects, plus miscellaneous plate work on which estimates are being prepared, are expected to take fully 35,000 tons. Actual inquiry is showing a sharp upturn, and rolling schedules are better balanced than at any time in several months. Several railroads have come into the market for a total of 5600 freight cars and 500 underframes. The Texas & Pacific will buy 1000 cars and the Southern Railway, 2450 cars and 500 underframes, while the Louisville & Nashville is asking for prices on 2150 freight cars. Actual inquiry from the Chicago & North Western now stands at 500 70-ton hopper cars, and 2000 additional units will either be purchased in the open market or constructed in the shops of that railroad. Following closely an order for 240 underframes, the Fruit Growers' Express will buy 600 steel underframes. On the whole, the plate market is more active and prices are steady at 1.90c. per lb., Chicago, for lots of 100 tons or more.

Mill prices on plates per lb.: 1.90c., base, Chicago.

Structural Material.—Activity is confined more to progress on old projects than to awards. The Chicago Board of Trade has plans well under way for a 40-story structure, and reports are that the Steuben Club Building, which is also to be 40 stories high, has been fully financed. The situation so far among shops has reversed. In recent weeks awards for the most part have been of a size adapted to small shops, with the result that books of small fabricators are comfortably filled as winter breaks, whereas large shops are working on a close margin, closer than is considered satisfactory at this time of the year. A reaction to this may be more active competition for small tonnages on the part of shops of large output. The Texas & Pacific has placed an order for 1000 tons for a bridge at Melville, La., and the Burlington will buy 1200 tons for bridge work. Local producers of plain material are holding to 1.90c. per lb., Chicago, for orders of 100 tons or more.

Mill prices on plain material per lb.: 1.90c., base, Chicago.

Cold-Rolled Strip.—Competition, as well as lack of interest on the part of buyers, continues to press down prices, which have reached a low of 2.90c., Cleveland, or 3.20c., delivered Chicago.

Bars.—In soft steel bars both inquiries and specifications are measurably lighter, this commodity being particularly affected by the inventory period. However, new sales, practically all for delivery before the end of the year, are more than equal to the combined purchases of plates and shapes. Here and there a buyer shows some interest in first quarter requirements, but he is the exception. Contracts at 1.85c., Chicago, are rapidly nearing completion, and new business is being taken at 1.90c. per lb. in 100-ton lots. In alloy steel bars shipping schedules to automobile manufacturers are heavier, and, according to present indications, deliveries will become larger as the month advances. Prices are unchanged.

Mill prices per lb.: Soft steel bars, 1.90c., base, Chicago; common bar iron, 1.90c., base, Chicago; rail steel bars, 1.80c., base, Chicago.

Wire Products.—Demand for wire products is unusually steady for this time of the year. While adjustment of operations in various departments is necessary from time to time, nevertheless output as a whole remains close to 60 per cent of capacity. With the announcement of first quarter prices, the jobbing trade is showing interest in contracts, but, on the other hand, manufacturers are slow in buying for forward delivery and are holding specifications to the minimum. Cold weather, reaching well into the Central States, has checked the distribution of wire products to some extent, and sales in the Northwest are slower, following one of the best fall trade periods in a number of years. Orders from the South and Southwest are well diversified and in fair tonnage. Tests have not been made of the price of $2.60, Chicago, on nails recently announced by the leading producers.

Rails and Track Supplies.—Purchases of standard-section rails total 64,500 tons. The Chicago, Milwaukee & St. Paul has ordered 40,000 tons from the Illinois Steel Co. and 10,000 tons from the Inland Steel Co. The Grand Trunk has placed 7000 tons with the Illinois Steel Co. and 2500 tons with the Inland Steel Co. It is also reported that the Chicago, Indianapolis & Louisville has entered an order for 5000 tons with a mid-Western producer. Rail mill operations are steady, but have not reached the proportions expected by producers. Shipping schedules are rapidly being formulated. Two users of light rails have closed for 500 tons each for delivery in the first quarter. In track accessories both sales and inquiries are in good volume.

The Southern Pacific Co. has distributed rail orders as follows: 22,000 tons to Bethlehem Steel Co., 30,900 tons to Tennessee Coal, Iron & Railroad Co. and 17,600 tons to Colorado Fuel & Iron Co.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Reinforcing Bars.—A feature of the reinforcing bar market is the sharp pick-up in large-sized inquiries, as contrasted with previous weeks throughout the fall. Architects are again busy, and estimators enter December with a long list of projects ahead of them. Revision in plans now places the bars required for a local plant of the Campbell Soup Co. at 3000 tons. Other Chicago projects requiring 500 tons or more each include a pumping station, a hospital, an office building and two public school buildings. Shop operations are a shade lower and competition is still keen, resulting in quotations below the schedule that dealers had hoped to maintain. Awards and fresh projects are given on page 1629.

Sheets.—Further weakness has developed in galvanized sheets, which have been sold in Chicago at 3.75c. Order mails are a trifle heavier and mill output has been stepped up, but there is no certainty as to the number or size of orders and rolling schedules are unusually close. Business in the South is dull, being below that usually expected at this time of the year. Producers attribute this to lack of credit in sections where crops were destroyed by spring floods. Interest is being shown in first quarter requirements, and several contracts have been taken at present quotations, though books have not been officially opened for that period.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.95c.; No. 24 galvanized, 3.75c. to 3.80c.; No. 10 blue annealed, 2.20c. to 2.30c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Coke.—Contracts for the first half of 1928 are well covered at $9, local ovens, and $9.50, delivered in the Chicago switching district. Shipments of by-product foundry coke are steady, and the total up to the first week in December is about equal to the tonnage delivered in the corresponding period of last year.

Bolts, Nuts and Rivets.—First quarter contracting is under way at the price levels that have prevailed in the fourth quarter. Specifications have fallen off during the week, and the industry is engaged at between 50 and 60 per cent of capacity.

Old Material.—Pressure by dealers to obtain higher prices from consumers is bearing fruit, and a number of sales, for the most part of small individual tonnages, have been closed at 25c. to 50c. above levels of a week ago. A shortage again exists in cast iron borings, and dealers are paying higher prices to cover old contracts. Several inquiries have come from foundries that have been out of the market for some time. Transactions among brokers are at higher price levels, and quotations to users have been advanced. Dealers are paying $12.25 for heavy melting steel, and they are naming that figure as the minimum to buyers, who so far have not succeeded in stemming the upward swing in the market. Sellers are finding more and more competition from purchasers who are actively engaged in bidding on railroad lists.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$11.75 to $12.25
Shoveling steel	11.75 to 12.25
Frogs, switches and guards, cut apart, and miscellaneous rails	12.75 to 13.25
Hydraulic compressed sheets	10.25 to 10.75
Drop forge flashings	9.00 to 9.50
Forged, cast and rolled steel carwheels	14.50 to 15.00
Railroad tires, charging box size	14.50 to 15.00
Railroad leaf springs, cut apart	14.50 to 15.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.50 to 14.00
Coil springs	14.75 to 15.25
Low phosphorus punchings	13.25 to 13.75
Electric Furnace Grades:	
Axle turnings	11.75 to 12.25
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	13.00 to 13.50
Rerolling rails	13.50 to 14.00
Cupola Grades:	
Steel rails less than 3 ft	14.50 to 15.00
Angle bars, steel	13.50 to 14.00
Cast iron carwheels	13.25 to 13.75
Malleable Grades:	
Railroad	12.75 to 13.25
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	13.50 to 14.00
Iron arch bars and transoms	17.75 to 18.25
Iron car axles	20.00 to 20.50
Steel car axles	14.50 to 15.00
No. 1 railroad wrought	10.25 to 10.75
No. 2 railroad wrought	10.50 to 11.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	4.50 to 5.00
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	7.00 to 7.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	13.00 to 13.50
No. 1 agricultural cast	13.00 to 13.50
Stove plate	11.75 to 12.25
Grate bars	10.75 to 11.25
Brake shoes	11.00 to 11.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.20c. to 2.65c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.20
Common wire nails, base per keg	$2.85 to 2.95
Cement coated nails, base per keg	2.95

Pool Interests in Patents on Four High and Continuous Mills

The United Engineering & Foundry Co., Pittsburgh, and the American Rolling Mill Co., Middletown, Ohio, have pooled their patents covering the four-high and continuous mills used in rolling wide strip steel, sheets and plates, and a new company is to be formed to hold the patents in which each company will have a 50 per cent interest. The American Rolling Mill Co. has patents on a system of rolling sheets direct from the ingot as developed and perfected at its Ashland, Ky., works and it recently acquired the Columbia Steel Co., together with patents on wide strip mills as applied at Butler, Pa., Weirton, W. Va., and Warren, Ohio. The United Engineering & Foundry Co. patents refer to the four-high mills.

New York

Several Advances in Finished Steel—Heavy Buying of Cast Iron Pipe

NEW YORK, Dec. 6.—Buying of pig iron for first quarter delivery is slow in gathering momentum. However, sales by local brokers during the week were in large part for shipment next quarter, and totaled 6000 tons, or about 500 tons more than in the previous week. The A. P. Smith Mfg. Co., East Orange, N. J., has bought 600 tons of Buffalo foundry iron for first quarter. The General Electric Co. has closed for 150 tons of low phosphorus for delivery during the next three months, but has not yet taken action on its inquiry for 1400 tons of high silicon foundry iron for its New England plants. The Worthington Pump & Machinery Corporation has placed 160 tons of foundry for Holyoke, Mass. There is a dearth of sizable new inquiries, and prices are substantially unchanged in the absence of severe tests.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail)	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.52
East. Pa. No. 2 fdy., sil. 2.25 to 2.75	20.39 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	20.89 to 22.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—Quotations for ferromanganese for the first half of 1928 have been announced as $100, seaboard basis, and they also go into effect at once. While most consumers are covered by contract for 1927 at $90, there have been sales for a few small lots of prompt shipment at $100. There has also been some fairly liberal specifying on old contracts for this year. Books are open for spiegeleisen at $30 to $32, furnace, for the higher grade, depending on quantity and shipment. New prices are also announced for ferrosilicon for 1928 as follows: 75 per cent, $135; 50 per cent, $83.50 per ton delivered, the latter being a reduction of $1.50 from this year's contract price. The 14 to 16 per cent electric ferrosilicon is quoted for next year at $45 per ton, f.o.b. Welland, Canada. There has been a reduction in standard ferrochromium of ½c. per lb. of contained chromium, next year's price standing at 11c., delivered. Silico-manganese has been reduced $5 a ton for next year, the 1 per cent carbon grade standing at $155 per ton, the 2 per cent carbon at $150 and the 2½ per cent carbon at $145. Fairly liberal contracts for most of these ferroalloys for next year's delivery have already been closed.

Fluorspar.—Substantial purchases of domestic fluorspar have been made at $16 per net ton, mines, and in some instances this price has been shaded 50c. a ton.

Cast Iron Pipe.—Purchasing by both privately and publicly owned water and gas companies continues active, and there is a good tonnage of pending business. As a result of recent buying, the market is showing more strength, so that on pipe for prompt shipment about $28 per net ton, base Birmingham, is usually the minimum and up to $30, Birmingham, is asked for first quarter delivery. On 1000 tons of water pipe for Providence, R. I., the low bidder is reported to have been R. D. Wood & Co. On a tonnage for Yonkers, N. Y., the low bid is understood to have been submitted by the United States Cast Iron Pipe & Foundry Co. The Middlesex Water Co., Rahway, N. J., is reported as about to close on 5000 tons of water pipe. The 10,000 tons of gas pipe for the Interstate Equipment Corporation, 25 Church Street, New York, was distributed among several makers. Among sizable tonnages that are still under consideration are 15,000 tons of water pipe for the Federal Water Service Corporation, 27 William Street, New York, 8000 tons of gas pipe for the Public Service Co., Newark, N. J., and about 6000 tons of gas pipe for the United Gas Improvement Co., Philadelphia.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $36.25 to $37.25; 4-in. and 5-in., $41.25 to $42.25; 3-in., $51.25 to $52.25; Class A and gas pipe, $4 to $5 extra.

Finished Steel.—The apparent success attending the efforts of producers of plates, shapes and bars to put prices on the basis of 1.80c., Pittsburgh, for the larger lots and 1.90c. for small lots, together with advances in prices of sheets by some makers and reaffirmation of the $2.55 price on wire nails, with new and higher extras, have created a more cheerful feeling in offices of steel companies. This optimism is based more largely on expectations of an improved price situation on all products in first quarter, there being little in the present restricted volume of buying to warrant cheer on that score. Buyers have accepted the 1.80c. price on plates, shapes and bars for first quarter, and particularly in the case of bars, contracts for that period have been made with quite a number of large consumers, some-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.30c.
Flats and squares	3.80c.
Cold-rolled strip, soft and quarter hard,	6.00c. to 6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread,	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¼-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¼-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.90c. to 4.00c.
No. 22	4.05c. to 4.15c.
No. 24	4.10c. to 4.20c.
No. 26	4.20c. to 4.30c.
No. 28*	4.35c. to 4.45c.
No. 30	4.60c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.50c. to 4.60c.
No. 20	4.65c. to 4.75c.
No. 22	4.70c. to 4.80c.
No. 24	4.85c. to 4.95c.
No. 26	5.10c. to 5.20c.
No. 28*	5.35c. to 5.45c.
No. 30	5.75c. to 5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

times at the buyer's request. Specifications against low-priced contracts expiring Dec. 31 are being urged by the mills, with the notification that unspecified tonnage will be canceled. A disturbing situation in bars is the effort of some makers of drop forgings, who supply a large automobile company, to cover at 1.70c., Pittsburgh, which so far as is known mills have declined to accept. However, this is the first instance of extreme pressure for a price concession larger than the mills seem willing to grant. The announcement by the Wheeling Steel Corporation of an advance on black sheets to 2.90c., Pittsburgh, and on galvanized sheets to 3.75c., with an extra of 10c. per 100 lb. on blue annealed sheets wider than 40 in., has been followed by others, but a few mills have covered their principal customers for first quarter at the old prices. Blue annealed sheets remain at 2.10c., Pittsburgh, to compete with the product of the continuous mills, which so far has not exceeded a width of 36 in. In addition to raising the base price of nails to $2.55 per 100-lb. keg, whereas recent sales have been at $2.45 and $2.50, makers of nails have established a new card of extras, printed elsewhere in this issue, and are protecting their jobbing trade on small lots by charging full extras on less than carloads, while carload lots or more take a 10 per cent discount. There have been no changes on bright wire annealed or galvanized nor any on woven wire fencing, but barbed wire prices will average about 5c. per 100 lb. higher, while wire rods are put back to $42, Pittsburgh. Under the new tin plate price of $5.25 per base box large buyers will not get, it appears, the liberal concessions that were granted under the $5.50 base, these extras having sometimes amounted to 40c. per 100 lb. Small buyers, roughly calculated as those using not more than 50,000 base boxes per year, will pay full prices, while larger buyers will get discounts based on the size of their annual consumption. Structural steel tonnage increased in November in the East, and specifications against contracts running to the end of the year are being received in fairly good volume. Talk persists of a further advance on plates, shapes and bars to 1.90c., Pittsburgh, but buyers will first be given an opportunity to contract for first quarter at 1.80c. New inquiry from the railroads totals nearly 6000 cars, so that 10,000 cars are pending, a total much larger than has been before the car builders in many months. Bookings of fabricated structural steel, exclusive of bridges, subways, etc., in the metropolitan district, as reported to the Structural Steel Board of Trade, amounted to 37,000 tons in November. This compares with 28,000 tons in October and with 26,000 tons in November, 1926.

Mill prices per lb., delivered New York: Soft steel bars, 2.14c.; plates, 2.14c.; structural shapes, 2.14c.; bar iron, 2.14c.

Reinforcing Bars.—Igoe Brothers will furnish 800 tons of bars for a highway viaduct at Newark. Some other jobs of fair size have been let in the last week, but the market in general lacks activity. No important additions to new work pending have been reported. Prices, although unchanged, are stronger as a result of the advance in mill prices on merchant bars.

Warehouse Business.—Despite the advanced season, sales of structural steel from stock are reported unusually good. Prices are fairly firm except for occasional weakness in steel bars, which encounter competition from imported material. The sheet market is fairly active, with concessions of $1 to $2 per ton still in evidence.

Coke.—The local producer of by-product coke has opened its books for first quarter and first half contracts on the basis of prices prevailing at time of delivery. Connellsville coke prices continue unsteady, with good standard foundry coke obtainable at about $4 per net ton, ovens. Standard furnace has been offered at $2.75 to $3, Connellsville. Delivered prices on Connellsville foundry coke are: To northern New Jersey, $8.03; to New York or Brooklyn, $8.79; to Newark or Jersey City, N. J., $7.91. By-product foundry coke ranges from $9.45 to $9.85 per net ton, delivered Newark or Jersey City, N. J.

Old Material.—Buying prices of all grades continue substantially unchanged in a quiet market. No. 1 heavy melting steel is still being purchased at $13.50 per ton, delivered eastern Pennsylvania. Yard grade is quoted at $10 to $10.50 per ton, delivered to eastern Pennsylvania consumers, but on shipments to western Pennsylvania, a few brokers are offering a delivered price that nets the seller better than $7 per ton, New York. Rerolling rails are being purchased at $15.25 per ton, delivered Williamsport, Pa. The Pennsylvania Railroad opens bids this week on a list of close to 50,000 tons of various grades.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.25 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.25 to 8.50
Locomotive grate bars	8.25 to 8.50
Machine shop turnings	6.00 to 7.00
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.25
Mixed borings and turnings	6.00 to 7.50
Steel car axles	16.00 to 17.00
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.75
Forge fire	6.50 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.75 to 9.25
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.50 to 12.00

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.50 to $14.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.50 to 12.00
No. 2 cast (radiators, cast boilers, etc.)	11.00 to 11.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Cleveland

Improved Sentiment in Steel Trade—Pig Iron Sales Total 50,000 Tons

CLEVELAND, Dec. 6.—Mills entered a fair volume of orders for finished steel during the week, and sentiment in the trade shows improvement. This seems largely due to some increase in demand from the automotive industry, together with the expectation of a further expansion in business from that source, and to slightly more activity in some of the other consuming industries. The appearance of the new Ford car has removed an uncertainty that for some time has hampered the entire motor car industry. The Ford company is releasing specifications more liberally and will have to buy a heavy tonnage of steel before it gets into good production early in the year. This company purchased 1000 tons of alloy steel bars during the week. The Chevrolet Motor Co., which has been marking time recently, is scheduled to start up all its plants Dec. 12 on its new models. This company purchased 1000 tons of sheets in the past week. New orders from motor car builders have enabled some of the Ohio sheet mills to materially increase their operations. While much of the business in steel bars, plates and structural material is in specifications against orders placed at 1.75c., some current business is being taken at the present price of 1.80c., Pittsburgh, which is being firmly maintained, although not much effort is being made to get 1.90c. for less-than-carload lots. A good number of first quarter contracts have been taken at 1.80c., and a fair volume of inquiry for contracts is pending. Structural demand has quieted down, although some inquiries have come out for highway bridge work and a large amount of this work is in prospect for next year. With the announcement of the new extras on wire

nails, nail manufacturers have stiffened their prices, now asking $2.55, base, Cleveland.

Pig Iron.—The market continues active, and sales by Cleveland interests during the week aggregated 50,000 tons in foundry and malleable iron. Furnaces are booking considerable business in central and southern Ohio, in Indiana, Michigan and western New York. A large share of the business in southern Ohio is still going to Lake furnaces. Not much iron is being purchased by the automotive industry in Michigan, but shipping orders from that source show some gain. Sales are nearly all for the first quarter. While some buyers have contracted for the first half, furnaces, in view of present low prices, prefer not to sell beyond the first quarter. There is considerable inquiry pending, including 2000 tons from southern Ohio and 1000 tons from Kokomo, Ind. While furnaces are not trying to get higher than ruling current prices for the first quarter, one Lake furnace, which has been an active competitor for business, is showing less disposition to meet the low prices that are prevailing in territories where it has a freight disadvantage. Lake producers continue to quote foundry iron at $16.50, furnace, for delivery in the competitive territories, particularly in southern Ohio, and are waiving half or all the silicon differentials, but deny going below $16.50 for the base grade. In northern Ohio some business is being taken at $17, furnace. In Cleveland the price is unchanged at $18, furnace. That also continues to be the ruling furnace price for Michigan delivery.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Coke.—One maker of a premium brand of Connellsville foundry coke has opened its books for the first half at its present price of $5.10 per ton, ovens. The prices on better grades of standard coke range from $4.25 to $4.50, although some grades are available at $3.75. Foundry heating coke is unchanged at $2.75 to $3, ovens.

Ferroalloys.—Producers of ferromanganese have announced a price of $100 per gross ton for the first half, or an advance of $10 over the present price. Prices are also out on electric ferrosilicon for the first half or full year. These have been reduced from $85 per gross ton, delivered, to $83.50 for 50 per cent, and to $135 for 75 per cent. On 15 per cent a price of $45 per ton, Niagara Falls, is being quoted. Ferrochrome has been reduced ½c. per lb. to 11c. per lb. for the first half or entire year. Several consumers of ferroalloys have placed contracts at the new prices.

Bolts, Nuts and Rivets.—Several bolt and nut manufacturers have opened their books for the second quarter at the present price. The leading local rivet manufacturer has also opened its books for the first quarter at the present price of $2.75, Cleveland and Pittsburgh, for large rivets and 70 and 10 per cent off list for small rivets. Bolt and nut orders have improved slightly, and several inquiries for fair-sized lots came out during the week from the automotive industry. Bolt and nut manufacturers look for a good volume of business next month.

Semi-Finished Steel.—Sheet mills are as yet showing no interest in first quarter contracts for sheet bars. It is expected that the present prices will be reaffirmed, although some consumers feel that, with the low sheet prices current, they will be justified in asking for a reduction.

Sheets.—The market is still weak, in spite of the announcement by several mills that they will hold to 2.90c., Pittsburgh, for black sheets, 2.10c. for blue annealed and 3.75c. for galvanized both for current orders and for the first quarter. Consumers are not showing much interest in first quarter contracts, and a number of mills have not yet announced prices for that delivery. Black sheets are rather steady in this market at 2.75c., Pittsburgh, except on barrel stock, on which concessions are being made. Blue annealed and galvanized sheets are unchanged at 2c. to 2.10c., Pittsburgh, for the former and 3.65c., Pittsburgh or the Valley, for the latter. Some of the mills are selling automobile body sheets at 4c. for car lots, although 4.15c. is supposed to be the small-lot price. The market appears to be extremely weak in the Detroit territory, where black sheets have sold at 2.65c., Pittsburgh, and where quotations are reported of 1.90c. on blue annealed sheets carrying pickling and deep drawing extras. While the price of $5.25 per box for tin plate announced for the first half represents a reduction of $5 from the recently ruling quotation, the lower price has been appearing for some time.

Strip Steel.—The demand for cold-rolled strip is somewhat more active than recently, but hot-rolled material continues to move slowly. Prices are still weak. Hot-rolled strip, 6 in. wide and wider, ranges from 1.85c. to 1.90., Pittsburgh, although a good tonnage of wide material would probably still bring out a price of 1.75c. On material under 6 in. wide the range is 1.90c. to 2c. Cold-rolled strip is rather steady at 2.75c., Cleveland or Pittsburgh, for 3 tons or over, although there are reports that this price has been shaded in the Detroit territory. The demand for fender stock has suffered because some of the automobile companies are now using automobile body sheets in place of fender stock for one-piece fenders and aprons.

Reinforcing Bars.—Several round lots are pending, but inquiry has dropped off. Small lots are in fair demand. Prices on rail steel bars range from 1.65c. to 1.70c., mill.

Warehouse Business.—There is a slowing down in the demand. While orders are as numerous as recently, they are for smaller lots. Sheets out of stock are moving slowly. Although occasional shading is reported, prices are being well maintained.

Old Material.—Demand shows no improvement and prices are no firmer, in spite of better sentiment among dealers. Mills are unwilling to pay any more for scrap and are not disposed to load up at the present low prices. The better feeling among dealers seems to be due to expectations of better business in January. A Cleveland mill purchased several hundred tons of heavy melting steel during the week at prices ranging from $14 to $14.25. Another Cleveland consumer, who has taken no shipments of blast furnace scrap for some time, has released shipments of these grades. Consumers are not taking other grades any more freely than recently. Dealers are still able to buy heavy melting steel at $13.50 for No. 1 and $13 for No. 2. Quotations are unchanged.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel		$13.50
No. 2 heavy melting steel		13.00
Compressed sheet steel	$12.50 to	12.75
Light bundled sheet stampings	11.00 to	11.50
Drop forge flashings	12.00 to	12.50
Machine shop turnings	9.00 to	9.25
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	13.50 to	13.75
No. 1 busheling	11.50 to	11.75
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phosphorus forging crops	16.50 to	17.00
Low phosphorus, billet, bloom and slab crops	17.00 to	17.50
Low phosphorus sheet bar crops	16.50 to	17.00
Low phosphorus plate scrap	16.00 to	16.50
Blast Furnace Grades		
Cast iron borings	10.50 to	10.75
Mixed borings and short turnings	10.50 to	10.75
No. 2 busheling	10.50 to	10.75
Cupola Grades		
No. 1 cast	16.00 to	16.50
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft	18.00 to	18.50
Miscellaneous		
Railroad malleable	15.00 to	15.50
Rails for rolling	16.25 to	16.50

Steel mill units and their proper lubrication fill the greater portion of the September-October number of the "DeLaval Centrifugal Review," a publication of the DeLaval Separator Co., New York. The advantages of cleaning the oil before putting it back into the system are brought out in considerable detail.

Philadelphia

Low-Priced Steel Tonnage Is Being Ordered in More Freely

PHILADELPHIA, Dec. 6.—Price advances effective on first quarter steel business now embrace black and galvanized sheets and wire nails as well as plates, shapes and bars. Not all sheet companies have announced the new prices, but those which have not done so are prepared to follow the advance shortly. Meanwhile, consumers and jobbers are being given the opportunity to cover their requirements until the end of the year at the old prices. Specifications for plates, shapes, bars and sheets are coming to steel companies' selling offices more freely than last month, and it is predicted that December will show a marked gain in bookings. First quarter contracts are being made at the new prices, but only in a comparatively few cases. The new sheet prices are 2.90c., Pittsburgh, for black and 3.75c., Pittsburgh, for galvanized, with no change as yet in blue annealed, except that an extra of 10c. per 100 lb. is to be applied to widths over 40 in. This makes narrow sizes 2.10c. and wide sizes 2.20c., Pittsburgh. The new wire nail price is $2.55, Pittsburgh, per 100 lb. keg.

The extreme apathy of pig iron buyers and the large stocks of iron piled at some Eastern furnaces leave little of encouragement to the pig iron trade. Prices are weak but no lower. The stronger tone of the scrap market is more in expectations than in accomplishment.

Pig Iron.—Consumers of pig iron who have not covered for their first quarter requirements seem in no hurry to do so, there being an absence of both inquiry and sales of importance for that delivery, a circumstance not hard to explain in view of the reduced operations at many foundries and the fact that the plentiful supply of iron encourages buyers to believe that prices will not go higher in the near future. Some Eastern furnaces have large stocks on their yards, and another stack, one at Port Henry, N. Y., is due to go in blast early next month. Prices for foundry iron remain at $19, furnace, for 1.75 to 2.25 per cent silicon and $19.50 for 2.25 to 2.75 per cent silicon, but these prices have met with no severe test. It develops that recent purchases of basic and Bessemer iron by a large Eastern user totaled at least 30,000 tons. Imports are again fairly heavy, totaling 4460 tons last week.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$19.76 to $20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.26 to 20.76
East. Pa. No. 1X	20.76 to 21.26
Basic (delivered eastern Pa.)	19.00 to 19.50
Gray forge	19.50 to 20.00
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	25.29 to 25.54
Virginia No. 2X, 2.25 to 2.75 sil.	25.79 to 26.04

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, ⅜-in.	2.80c. to 3.00c.
Structural shapes	2.50c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c. to 2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.25c. to 5.25c.
Cold-finished steel, squares and flats	3.75c. to 5.75c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to ⅛-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c. to 4.35c.
Galvanized sheets (No. 24)	5.10c. to 5.20c.
Blue annealed sheets (No. 10)	3.20c. to 3.30c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Ferromanganese.—English makers of ferromanganese last week set their price at $100, seaboard, for first half contracts, and the two principal American producers, the Bethlehem Steel Co. and the Lavino Furnace Co., adopted the same price. Predictions of the advance have been current in the trade for two or three weeks, with the result that many consumers have specified heavily. It is believed that some have ordered in stocks that will last well into first quarter. A few contracts at $100 have been made.

Plates, Shapes and Bars.—A few contracts for first quarter have been made at 1.80c., Pittsburgh, but these have been more largely in bars than in plates and shapes. Specifications on contracts made before the advance are coming to the mills at a better rate than last month, and predictions are made that this month's bookings will total greater than those of October or November. However, it is apparent that some of the material is being ordered for stock, as consumer's requirements have not greatly increased, if at all. In the structural field new projects are at a minimum and fabricating shops are in need of work.

Sheets.—Some mills have notified their customers that prices for first quarter will be 2.90c. for black sheets, 3.75c. for galvanized and 2.10c. for blue annealed, Pittsburgh base, with a 10c. per 100 lb. extra for blue annealed wider than 40 in. Continuous sheet mills are quoting 2.10c. on the range of sizes they roll, generally not wider than 36 in., so an advance on this grade could only be made to apply on the sizes which the continuous mills cannot make. Some contracts for first quarter were made before this extra was announced, so its effect may not be felt fully until the second quarter of the new year.

Imports.—Last week's imports of 4460 tons of pig iron included 2651 tons from England and 1809 tons from India. Steel imports amounted only to 48 tons, consisting of bars, shapes and wire rods from Belgium and Germany.

Old Material.—Actual improvement in the scrap market has been limited to one or two items, but dealers and brokers continue to take a more cheerful view of the situation, predicated largely on the expectation of an upward trend in steel production in the first quarter of the new year. There has been very little buying, but such as there has been has brought slightly higher prices, notably on No. 2 steel and machine shop turnings. Brokers are less interested in making short sales, fearing the market may go against them before they have covered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	15.25 to 15.75
Bundled sheets (for steel works)	10.00 to 10.50
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	11.00 to 11.25
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to 18.50
Couplers and knuckles	16.00
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.00 to 10.50
Machine shop turnings (for rolling mill)	11.00 to 11.50
Wrought iron and soft steel pipes and tubes (new specifications)	11.50 to 12.00
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00
Steel rails for rolling	15.00 to 15.50
Cast iron carwheels	15.50
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	15.00 to 15.50

Testing Society to Meet at Atlantic City Next Year

Atlantic City has been chosen for the 1928 annual meeting of the American Society for Testing Materials. The executive committee has fixed upon June 25 to 29, with the headquarters at the Chalfonte-Haddon Hall.

San Francisco

Pending Fabricating Work Totals 20,000 Tons—Stronger Demand for Pipe

SAN FRANCISCO, Dec. 3 (*By Air Mail*).—Major developments during the past week on the Coast included the award of 1082 tons of cast iron pipe for San Diego, Cal., 400 tons of reinforcing steel for Los Angeles County and 1000 tons of structural material for two pulp mills in Washington, one at Port Townsend, requiring 400 tons, and the other at Hoquiam, calling for 600 tons, both placed with McClintic-Marshall Co.

Imports.—A tabulation of imports of iron and steel products for the month of September shows the following: Coke, 2493 tons, as against 8110 tons for August, 1526 tons of which entered the port of San Francisco; pig iron, 2026 tons, as compared with 2432 tons for the previous month, 1193 tons of which was delivered at San Francisco; steel bars (reinforcing and merchant material), 4822 tons, as against 3638 tons for August; cast iron pipe, 2310 tons, as compared with 4211 tons for the preceding month, 1900 tons of which was unloaded at Los Angeles; structural shapes, 2482 tons, compared with 3067 tons in August, 1679 tons of which was for San Francisco, and tubular products, 1185 tons, as against 1794 tons for the previous month. The bulk of the cast iron pipe was shipped by French mills. Close to 1800 tons of the pig iron imported came from British India. Of the total of 23,666 tons of structural shapes imported since the first of the year, fabricators in the Bay district have taken 14,000 tons.

Pig Iron.—This market remains stationary, and those sales that have been reported involved small tonnages only. It is understood that another large shipment of Indian foundry iron is en route to apply against contracts placed several weeks ago. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—One of the most encouraging things about the structural shape market at present, which for some time has been greatly upset, not alone by the low prices being quoted on foreign plain material, but also by the low quotations that have come out on fabricated and fabricated and erected projects, is the fact that close to 20,000 tons is up for figures. Awards this week, in addition to the two pulp mill projects mentioned above, included 200 tons for cells at the State prison, San Quentin, Cal., booked by the Palm Iron Works. Pending business includes 5000 tons for a department store in Oakland, Cal.; 2100 tons for two bridges at Seattle, Wash.; 3000 tons for the Coyote Point bridge, San Francisco; 4000 tons for an athletic club in Los Angeles and 900 tons for an apartment building in San Francisco. Domestic plain material is firm at 2.40c., c.i.f. Foreign material is quoted around 1.60c., c.i.f., duty paid, and at least one fabricator this week was quoted 1.58c.

Plates.—Activity is limited to a few small projects involving lots of less than 100 tons. The last large project placed was awarded over a month ago and called for 400 tons for a pipe line in Alaska. Mill prices on plates continue at 2.40c., c.i.f.

Bars.—Outstanding among the awards this week was 400 tons for the Los Angeles County Flood Control District, booked by the Pacific Coast Steel Co. Other awards included 200 tons for a wharf in Oakland, Cal., placed with the Frederick Steel Co., and 100 tons for a garage in Berkeley, Cal., taken by Gunn, Carle & Co. Bids were opened this week on 160 tons for Los Angeles County, on which a Los Angeles distributer was low bidder. No action has yet been taken on the 8500-ton inquiry for the Coyote Point bridge across San Francisco Bay. Most lettings continue to comprise lots of less than 100 tons each. Out-of-stock prices in the Bay district are weak and range from 2.20c. to 2.50c.

Cast Iron Pipe.—Demand for cast iron pipe is stronger, and several fair-sized lettings are pending. The largest award was 1082 tons of 6 to 12-in. Class B pipe for the improvement of Market Street, San Diego, Cal., placed with E. Paul Ford. Pending business totals over 6000 tons. Bids open next week on from 680 to 3500 tons of 4 to 24-in. pipe for Ventura, Cal., and alternate bids will be taken on other types of pipe. Gogo & Rados were low bidders on 491 tons of 4 and 8-in. Class B pipe for Santa Ana, Cal. Bids have been opened on 952 tons of 4 to 12-in. Classes B and C pipe for Glendale, Cal., and on 100 tons of 12 to 16-in. Classes B and C pipe for Seattle, Wash. Burlingame, Cal., will open bids on Dec. 13 for 835 tons of 2 to 12-in. Class B pipe. The present tendency is toward higher prices, but $36, delivered, on 6-in. and larger is still being quoted.

Steel Pipe.—Movement of standard steel pipe and oil country goods continues to be limited to unimportant tonnages. Only two projects are up for quotations at present. One involves 244 tons of 4 and 6-in. standard screw pipe for the city of Los Angeles, Spec. Adv. No. W-844, on which bids will be taken Dec. 8, and the other calls for 294 tons of 3-in. standard pipe for Ventura, Cal., bids on which go in Dec. 5.

Rails.—The Seattle Municipal Railroad has again deferred action on its inquiry for 1150 tons of girder and T-rails. Bids have been received, and the Bethlehem Steel Co. is the low bidder. No other inquiries for track material or fastenings are before the trade for quotations.

Coke.—Consumers are displaying little interest in the market at present, and stocks in foundry yards are sufficient to take care of immediate requirements. Several shipments of foreign material are en route. No change is noted in prices.

Coke prices per net ton at incoming dock: English beehive coke, $16 to $16.50; English by-product, $12.50 to $13.50.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.35c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.35
Cement coated nails, 100-lb. keg	3.35

Birmingham

Rail Orders Booked by Tennessee Company Total 140,000 Tons

BIRMINGHAM, Dec. 6.—With a large part of the month's pig iron business already placed, the market is more or less marking time, awaiting first quarter developments. The furnaces continue to sell and quote on a $16 base for December only. Their books have not yet been opened for 1928 tonnage, but an early move in that direction is anticipated. Producers hope for a continuance of forward buying through the first quarter. The present quarter has been a very satisfactory one both from the standpoint of bookings and of shipments. November shipments of merchant producers exceeded the make, and yard stocks of foundry iron were reduced. Shipments for December to date have been at nearly the same rate. Day-to-day buying in small lots is in steady volume. No change in the number of active furnaces has occurred for some weeks. Eighteen are in blast, nine being on foundry, eight on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.50
Basic	16.00

Finished Steel.—Buying of miscellaneous steel products remains active. Bookings and inquiries are at about the same level as for several weeks past. Fab-

ricators of structural steel and manufacturers of reinforcing bars have received a number of small orders, calling for a satisfactory aggregate tonnage. The Tennessee Coal, Iron & Railroad Co. has taken a rail order from the Southern Pacific Co., reported at 44,000 tons. In recent weeks the Tennessee company has booked more than 140,000 tons of rails. The St. Louis-San Francisco Railway bought 37,500 tons, according to reports, and the Louisville & Nashville Railroad, over 60,000 tons, some of which has already been delivered. A number of other small orders have been reported. The car building department of the Tennessee company also shared in a Louisville & Nashville order. Open-hearth furnace operations are the same as last week, the Tennessee company having an average of six and seven active furnaces at the Ensley Works and four at the Fairfield Works. The Gulf States Steel Co. is operating four.

Cast Iron Pipe.—The market is quieter than in any week for some time past. Small orders are fewer, and inquiries also are in smaller volume. From the inquiries received it is judged that first quarter business will be of fair proportion and pressure pipe plants look for an improved market situation. There is also some talk that base price, now around $28 per net ton, Birmingham, will be advanced.

Coke.—Buying has slackened and new business is expected to be small until after the holidays. Most of December requirements have already been bought, while some first quarter business has also been handled. Quotations on foundry coke are $5 a ton, Birmingham, for both December and first quarter deliveries. Domestic coke has improved only slightly, due to a recurrence of warm weather. The rate of production is unchanged, and shipments are reported as fair.

Old Material.—Only a small amount of buying is in progress. Inquiries are light, and the condition of the market has changed but little. Prices have remained stationary for several weeks.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$10.00 to $10.50
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	18.00 to 20.00
No. 1 railroad wrought	10.00 to 11.00
Rails for rolling	12.00 to 13.00
No. 1 cast	14.50 to 15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

St. Louis

Further Gain in Pig Iron Sales—Scrap Market Stiffens

ST. LOUIS, Dec. 6.—Sales of pig iron during the last week were larger than for any similar period in some time. The Granite City maker reports the sale of approximately 23,000 tons, the bulk of which was basic iron, part for shipment during December and the remainder for delivery through the first quarter. The local maker also reported a liberal scattering of foundry iron sales, with the total volume greater than in any week in several months. A leading Southern interest sold during the week 3500 tons of iron in lots of 100 tons up to 800 tons, all for shipment during December. Demand is much improved. Melters seem to feel that the market has reached bottom and are showing greater interest in their requirements.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Colder weather has given a needed stimulus to the buying of domestic grades of coke. The demand for industrial grades is only fair.

Finished Steel.—The market for sheets seems to be unsettled, with complaints of price cutting for immediate business being heard. Prices for first quarter have not been announced. Some inquiries are being received for plates, shapes and bars for first quarter, but no quotations for that delivery are available. Structural steel fabricators need business badly to keep their plants operating. Awards of reinforcing material during the week totaled 1550 tons. Warehouse business shows no improvement over last month.

Old Material.—After months of dull trading and weakness in prices, the scrap market has taken a turn for the better, and prices on heavy melting steel, heavy shoveling steel, miscellaneous standard section rails, railroad springs and No. 2 railroad wrought are stronger, the spread on these items having increased from 25c. to 50c. During the week several sales of melting rails and specialties were reported at the higher prices, and it is understood that consumers would have taken greater quantities at present quotations. It is expected that additional sales to mills will be made during the week.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$10.75 to $11.25
No. 1 locomotive tires	13.00 to 13.50
Heavy shoveling steel	10.75 to 11.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.75 to 13.25
Railroad springs	13.00 to 13.50
Bundled sheets	8.00 to 8.50
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	9.50 to 10.00
Cast iron borings	8.75 to 9.00
Iron rails	12.50 to 13.00
Rails for rolling	13.50 to 14.00
Machine shop turnings	6.00 to 6.50
Steel car axles	18.25 to 18.75
Iron car axles	22.50 to 23.00
Wrought iron bars and transoms	19.50 to 20.00
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft	14.50 to 15.00
Steel angle bars	10.75 to 11.25
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	14.50 to 15.00
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	13.00 to 13.50
Agricultural malleable	11.50 to 12.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.80c.
Galvanized sheets (No. 24)	5.35c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.60c.
Boiler rivets	3.80c.
	Per Cent Off List
Tank rivets, $\frac{7}{8}$-in. and smaller	70
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped	60
Hot-pressed nuts, hexagon, blank or tapped	60

Merger of Ohio Sheet Companies Expected to Materialize

YOUNGSTOWN, Dec. 6.—Developments this week indicate that the merger of central and northeastern Ohio sheet steel companies, headed by the Mansfield Sheet & Tin Plate Co., will likely materialize. Directors of the Mansfield company have recommended the consolidation. The combined companies have a capacity of 400,000 tons of finished products and assets of $18,000,000.

It is likely that W. H. Davey, president of the Mansfield company, will head the merger and that headquarters will be in Youngstown. Details of the terms will be mailed to shareholders within a few days, it is announced. The merger plans have been worked out on an appraisal basis of hot mill values. This combination has been under way for more than a year. Other companies involved besides the Mansfield company include the Falcon Steel Co., the Waddell Steel Co. and the Thomas Sheet Steel Co., all of Niles, Ohio, the Empire Rolling Mill Co., Cleveland, and the Ashtabula Steel Co., Ashtabula, Ohio.

Boston

Plates and Shapes Firm but Sheets Still Weak—Pig Iron Quiet

BOSTON, Dec. 6.—The pig iron market is quiet. Sales in the past week fell short of 2000 tons in this territory, while the only open inquiry of any note is 1400 tons of No. 1X for first quarter delivery from the General Electric Co., of which 500 tons is for the Lynn, Mass., plant, 300 tons for Everett, and 600 tons for Pittsfield. Other pending business includes 250 tons of No. 2X and 250 tons of No. 1X for a Connecticut foundry and 140 tons for the Deane Pump Works, Holyoke, Mass. A Connecticut melter is understood to have just closed on 300 tons of No. 2 plain. The Troy, N. Y., stack is to blow in around the middle of April. Buffalo and east-of-Buffalo furnaces are waiving differentials on No. 1X and No. 2X, these two grades, as well as No. 2 plain, being available at $17 a ton, furnace. The Mystic company is quoting $19 to $21, furnace, depending on the freight. Upward of 90 per cent of the Buffalo iron now being sold is said to be bringing a minimum of $17, furnace. Some private negotiations for first quarter iron are under way. In contrast with reports from most lines of business, pig iron collections are good.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.91
Buffalo, sil. 2.25 to 2.75	$21.91 to 22.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Virginia, sil. 1.75 to 2.25	25.96 to 26.21
Virginia, sil. 2.25 to 2.75	26.46 to 26.71
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—Practically 90 per cent of the regular users of New England by-product foundry coke have signed sliding scale contracts for their requirements in the first half of 1928. The price on such fuel for current shipment remains at $12 a ton, delivered, within a $3.10 freight rate zone. Foundry coke made outside New England is offered at delivered prices that average $1 a ton lower than the price on New England fuel, but demand is limited to scattered car lots. Pig iron melt in New England is no more than holding its own, and most foundries that usually stock fuel for the winter have done so, which explains why shipments from New England ovens are not increasing.

Shapes and Plates.—Plates are in fair demand for specified work. Consumers are not buying ahead, however, as inventories are being held down to a minimum. The market for plates, as well as for standard shapes, is firm at 1.80c. per lb., base Pittsburgh, for round tonnages and at 1.90c. for small lots. Mill bookings of shapes are quite satisfactory. The Bath Iron Works Corporation, Bath, Me., is about to close on 450 tons of plates, 220 tons of shapes and 35 tons of rivets for a yacht. The Boston transit department closes bids Dec. 8 on 290 tons of structural steel.

Sheets.—Buying of sheets is in small lots. Stocks in consumers' hands are small. Mills look for increased buying after Jan. 1. On blue annealed sheets 2.15c., base Pittsburgh, is openly quoted, but 2.10c. can be done. The range of prices on galvanized sheets seems to be 3.60c. to 3.65c., base Pittsburgh, and on black, 2.75c. to 2.80c.

Bolts, Nuts, Rivets.—The demand for bolts, nuts and rivets from warehouse is somewhat smaller than a month ago. Stocks in users' hands are small and in warehouses are well assorted. Warehouse prices are shown in the table.

Strip Steel.—Demand for cold-rolled strip steel is fair, but consumers are buying conservatively, with a view to having small inventories on Jan. 1. Indications point to a more active market early next year. Competition between mills for business is keen.

Mill Prices on Cold-Rolled Strip in North Atlantic States: In 1 to 3-ton lots, 3.25c. per lb., base Pittsburgh, and also, 3.25c. to 3.40c. per lb., base Worcester, Mass.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co., the second lowest bidder, has been awarded 1000 tons of 4 to 12-in. pipe by Providence, R. I. A Birmingham foundry was the low bidder. Portland, Me., has awarded 300 tons of 8-in. pipe to R. D. Wood & Co. Salem, Mass., closed bids Dec. 6 on 100 tons of 6 and 8-in. pipe, and Fall River, Mass., will close Dec. 9 on 300 tons of 6 to 12-in. pipe. Pipe foundries have fairly large backlogs now and are not quite so ready to make price concessions as heretofore. Private bookings of water pipe tonnages are still in good volume, but the gas pipe market is quiet, although several utility companies are negotiating for round tonnages for 1928. Boston closes bids Dec. 21 on 1800 tons of 8 to 30-in. pipe and 50 tons of fittings.

Warehouse Business.—The movement of steel mill products from warehouses is heavier than last month or in December, 1926. Competition is keen, however, and prices are subject to concessions. Imported material is not, perhaps, such an important market factor as heretofore. Wire nails have been advanced $1 per ton.

Old Material.—At the auction sale of old material at the local Navy Yard, 353,737 lb. of structural scrap was sold at $6.55 a gross ton; 100,000 lb. of steel turnings, at $5.80; 100,000 lb. of burnt cast, at $9.05; and 56,000 lb. of boiler tubes, at $25. The Midvale Co. paid around $25 for armor plate, while mixed borings and turnings of rather inferior grade brought $5.80. Most of these prices are in line with those openly quoted in the Boston market. Machinery cast continues to sell fairly well at $15 to $15.50 a ton, delivered New England, with $15 the prevailing price. The Sullivan Machinery Co., Clairmont, N. H., has just bought 150 tons. The demand for material to be used outside of New England is light. Of the grades moving, the most active are heavy melting steel at around $9 a ton, on cars shipping point, specification pipe at about $8, borings and turnings at $6 and steel turnings at $6.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.50 to $9.00
Scrap rails	8.50 to 8.75
No. 1 railroad wrought	9.50 to 10.00
No. 1 yard wrought	8.50 to 9.00
Machine shop turnings	5.50 to 6.00
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	5.00 to 5.50
Forge flashings	5.50 to 6.00
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	5.75 to 6.00
Shafting	13.00 to 13.50
Street car axles	16.00 to 16.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.00
Rails for rerolling	10.00 to 10.50
Cast iron borings, chemical	10.00 to 10.50

Prices per gross ton delivered consumers' yards:

Textile cast	$15.00 to $15.50
No. 1 machinery cast	15.00 to 15.50
No. 2 machinery cast	12.50 to 13.00
Stove plate	11.00 to 11.50
Railroad malleable	13.50 to 14.00

Warehouse Prices, f.o.b. Boston

	Base per Lb
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

Cincinnati

Gain in Steel Buying Reflects Expansion in Consumption

CINCINNATI, Dec. 6.—The pig iron market has eased off somewhat following the recent buying movement, and orders placed in the past week fell short of 5000 tons, the largest consisting of 1000 tons for a Hamilton, Ohio, company. This transaction, as well as another in the same city for 600 tons, was closed at about $16.25, base Cleveland. Lake Erie furnaces are still seeking business in this district and are reaching out into Indiana for additional tonnages. Southern Ohio producers are standing by with a prohibitive price of $19, base Ironton. One company at Ironton, which is operating its furnace, is said to be piling a substantial amount of iron, while another, which is inactive, has succeeded in reducing its stocks only moderately in the last three or four months. In the South both Alabama and Tennessee companies are holding to $16, base Birmingham, but sales made north of the Ohio River have fallen off in the past seven days. A Southern maker is reported to have sold 500 tons of iron to an Evansville, Ind., melter. Jackson County silvery iron is moving rather slowly at the moment. Inquiries are scarce, but dealers are of the opinion that the volume of business will show improvement as the month progresses. A considerably higher net price will be obtained at Granite City, Ill., on foundry iron sold for Louisville, Ky., delivery than was indicated in this column last week. It is proposed to ship the iron by barge, but even the all-rail rate leaves a higher price at furnace than was reported.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	19.69
Alabama fdy., sil. 2.25 to 2.75	20.19
Tennessee fdy., sil. 1.75 to 2.25	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—From a tonnage standpoint the past week has been the best in several months. Almost without exception orders are for rush shipment. Consumers' stocks apparently have nearly reached the vanishing point, and it is necessary for buyers to purchase material to maintain present operations, which are gradually expanding. Manufacturers of heavy steel products have begun soliciting first quarter contracts on the basis of 1.80c., base per lb., Pittsburgh, for 100 tons or more and 1.90c. for single carloads of bars, plates and shapes. The structural steel market is rather quiet at the moment, no important awards having been made in the past three weeks. The United States Engineers at Louisville, Ky., are inquiring for 1500 tons of piling for Ohio River dam, No. 53, bids closing on Dec. 17. Fabricators continue to run their shops on a curtailed schedule pending the development of additional business. Irregularities are reported in common wire nails, which one producer is offering at a delivered price equivalent to $2.40 a keg at the mill. Some Eastern sellers are declining to meet this quotation and are holding strictly to $2.55, Pittsburgh. Orders placed with sheet manufacturers in this district show a better demand from the entire consuming trade, automobile makers having contributed a substantial portion of the total tonnage. The improvement, however, probably will not be reflected in increased mill operations for about two weeks. Despite the betterment in bookings, the price situation remains unsettled. In blue annealed stock 2.10c. to 2.15c., base Pittsburgh, continues to be the ruling market, but in black sheets some inquiries have brought out prices of 2.75c., although 2.80c. is more common. The range on galvanized sheets is from 3.60c. to 3.70c., while automobile body sheets are firm at 4c.

Reinforcing Bars.—Pending jobs call for about 5500 tons of bars, practically all of which will be awarded during December. New billet bars are quoted at 1.80c. to 1.85c., base Pittsburgh, and rail steel bars at 1.75c., base mill.

Warehouse Business.—The usual seasonal decline preceding the inventory period is adversely affecting the demand for steel from local warehouses. The tendency of mills to accept small orders also has had a depressing effect on the jobbing trade. Quotations are steady and unchanged.

Coke.—There has been a slightly increased demand from automobile foundries for by-product foundry coke, but the market is still quiet. While domestic grades show improvement, sales are below normal for this time of the year. In the New River district an important beehive coke operator is drastically curtailing production rather than reduce prices, which are quoted at $6.50 to $7.50 per net ton, f.o.b. ovens. A sanitary ware maker at Louisville, Ky., has contracted with a Wise County coke company for its requirements during the first six months of 1928. Shipments to foundries are expected to be light during the remainder of the month, because of the approaching inventory period.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—The market has a better undertone, although the demand from consumers has not increased. Dealers believe that an upward turn is near at hand and consequently are willing to pay 25c. a ton more for melting steel. In most cases mills are taking a fair amount of material on current contracts. The Norfolk & Western Railway has a list totaling 7500 tons closing this week.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	11.50 to 12.00
Loose sheet clippings	8.50 to 9.00
Bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.50 to 8.00
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	13.50 to 14.00
No. 1 railroad wrought	11.00 to 11.50
Short rails	17.00 to 17.50
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	16.00 to 17.00
No. 1 railroad cast	13.50 to 14.00
Burnt cast	8.00 to 8.50
Stove plate	9.25 to 9.75
Brake shoes	10.00 to 10.75
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.00 to 12.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Buffalo

Donner Stack to Be Banked—Advances in Sheet Prices Looked for

BUFFALO, Dec. 6.—There is a fair demand for pig iron. In addition to 1400 tons wanted by the General Electric Co. for New England delivery, there are three 1000-ton inquiries for foundry, including one from a New Jersey melter. Prices are firm at $17, furnace, for No. 2 plain foundry and $17.50 for malleable for delivery in this district. One maker is quoting $16.50, furnace, on New England business when competition forces it. There is little inquiry for basic. The Donner Steel Co. will probably bank one of its two blast furnaces for repairs toward the end of the month. This furnace is now running on foundry iron. It will be out of production not more than 10 days.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	17.00
Lake Superior charcoal	27.28

Finished Steel.—New sheet prices for first quarter are being awaited. There has been some shading in sheets, but it is expected the new quotations will be above the current nominal prices of 2.85c., base Pittsburgh, for black, 3.65c. for galvanized and 4c. for automobile body sheets. Specifications have been fair. One of the best purchases recently was one of 1800 tons of black sheets. In the bolt and nut market discounts are firm and specifications are fair. Most of the jobbers are holding down stocks in view of the approach of inventory-taking. Bars are firm at 2.015c., Buffalo, for fourth quarter and at 2.065c. for first quarter, with some contracting going on for next quarter. Pipe specifications are in good volume. The reinforcing bar market is quiet. There have been no sizable lettings, though the aggregate of small lots placed has been satisfactory.

Old Material.—The market is again quiet, following the 30,000-ton purchase of last week. A little stove plate has been moved at $13. Orders placed in the past couple of weeks will take care of the needs of the mills for December and most of January, it is estimated, so that no sizable purchasing is expected before the first of the year, particularly in view of the fact that one of the large consumers continues to regulate shipments. Knuckles and couplers and low phosphorus bloom ends are weaker. Considerable material on railroad lists last month was awarded to Buffalo bidders. For No. 1 heavy melting steel on these lists $14.50, delivered Buffalo, was paid.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	13.75 to 14.25
Scrap rails	13.25 to 13.75
Hydraulic compressed sheets	11.50 to 12.00
Hand bundled sheets	8.50 to 9.00
Drop forge flashings	11.50 to 12.00
No. 1 busheling	13.25 to 13.50
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.25 to 9.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50 to 15.75
Railroad coil and leaf springs	16.00 to 16.50
Rolled steel wheels	14.75 to 15.25
Low phosphorus billet and bloom ends	15.75 to 16.00
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	9.75 to 10.00
Cast iron borings	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	14.50 to 15.00
No. 1 railroad wrought	12.00 to 12.50
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	12.75 to 13.00
Locomotive grate bars	10.50 to 11.00
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Railroad	13.00 to 13.50
Agricultural	13.00 to 13.50
Industrial	13.00 to 13.50

Canada

Heavier Imports of Pig Iron—Rail Mills Busy—Structural Steel in Demand

TORONTO, ONT., Dec. 6.—While some inquiries for pig iron are making their appearance for first quarter delivery, local blast furnace representatives have not opened their books for orders past the end of the year, nor are they encouraging long term contracts at the moment. Orders for spot delivery are appearing at frequent intervals, and while these range from 50 to 200 tons, most orders are for from one to two cars. Despite the fact that no advance contracts have been placed, the general demand for foundry and malleable pig iron is maintained at a good level. The daily melt has not changed for some time past, and foundries continue to operate at between 60 and 80 per cent of capacity throughout Ontario and Quebec. Mill operations have been stimulated by recent bookings and have resulted in a larger production of pig iron, especially in the basic grade. Five blast furnaces are now blowing in this country. United States competition has been rather keen in the Canadian markets during the past six months, and this has not only had a tendency to hold down Canadian prices, but during the last two or three months has affected the production of foundry and malleable pig iron here, owing to the general increase in imports from the United States. Imports of pig iron average between 3000 and 4500 tons per month, which compares with an average of little more than 2500 tons per month in 1926. Canadian pig iron prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	25.50
No. 2 foundry, sil. 1.75 to 2.25	25.50
Malleable	25.50
Basic	24.50
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Rails.—The rail mill of the Dominion Iron & Steel Co. (British Empire Steel Corporation), Sydney, N. S., has gone on double shift and will continue on that basis until the end of the year, when it is expected that it will curtail operations and resume again in the spring. The Canadian National Railways have placed an order for about 10,000 tons of rails for immediate delivery, and the Dominion Iron & Steel Co. also has an order for 2000 tons of 127-lb. rails from the New York Central for its Canadian lines. In addition, the company has a standing order for 20,000 tons of rails for the Canadian National Railways to be rolled for spring delivery. After the first of the year the company will start the production of 10,000 tons of tie plates for the Canadian National lines, in connection with which order new machinery will have to be added to the Sydney plant. The Algoma Steel Corporation, Sault Ste. Marie, Ont., which has orders on its books for approximately 100,000 tons of rails for the Canadian National, Canadian Pacific and other Canadian roads, is running on 100-lb. rails at the present time which, up to the close of Great Lakes navigation, will be shipped to the head of the Lakes for use on the Western lines of the Canadian Pacific. The rail mill will continue at single turn until such a time as increased orders make double turn necessary. It is believed that both merchant mills will continue in operation throughout the winter months.

Structural Steel.—The strong demand for structural steel that has held throughout the greater part of this year shows no signs of falling off during the winter months. Several large structures are in prospect for the Toronto and Montreal districts, which will involve approximately 50,000 tons of steel. The Dominion Bridge Co. has the contract to supply 5000 tons for the new Bell Telephone Co., at Montreal, and is figuring on a number of other large contracts in various sections of the dominion. The King-Adelaide Corporation, Toronto, Ont., is planning to erect a building here which will call for between 10,000 and 15,000

tons of steel. About 10,000 tons will be required locally for a 28-story office building at King and Bay Streets for Holt-Gundy; and a 20-story building for Yolles & Rottenberg, Ltd., at Richmond and Bay Streets, will require approximately 8000 tons. A number of other buildings which will require between 500 and 2000 tons are also in prospect, while a number of contracts have also been awarded recently on which steel has not yet been delivered.

Old Material.—A few bright spots appeared in this market during the week. While no advance or large contracts were placed, local dealers reported a slight improvement in the spot demand. Current demand is mostly in small tonnages and is from consumers throughout the province. In the Montreal district there is no improvement in the market. Montreal dealers state that there has been a general slump in business on export account, and while some shipments are going forward to consumers in the United States they are much smaller than those of three or four months ago. Prices in both Toronto and Montreal markets continue to show weakness, but dealers have not revised their lists during the week.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Detroit

Debut of Ford Model and Gains by Other Motor Plants Improve Outlook

DETROIT, Dec. 6.—The reaction to the Ford Motor Co.'s presentation of its new model has been far-reaching. Interest in the new cars is general, and their effect on business is expected to be stimulating.

The Ford situation, however, is not the only bright spot in the automobile industry. The Packard company in the month just closed shipped 4370 cars, an increase of 1581 over the same month last year. The Hupp company shipped 5076 cars in November, which is an increase of 3282 over the figures of November, 1926. In fact, November of this year established a new record for Hupp production, even surpassing the output for June. Both Packard and Hupp have a substantial volume of advance orders and expect to operate practically at capacity for the remainder of the winter at least.

November shipments for the Paige-Detroit Motor Car Co. likewise established a record for this season of the year, amounting to 2401. This is an increase of 1474 over the output of November a year ago.

The Buick company's production is averaging about 1000 per day, reflecting practically no winter lull. The Buick company's steel specifications for the first quarter will be issued next week. While the Chevrolet works have been down temporarily for inventory, steel specifications were issued last week for first quarter. Specifications for steel from the Ford Motor Car Co. of Canada are expected next week.

While automobile body sheets are being quoted at 4c., Pittsburgh, on No. 20 gage stock, there is a persistent report that an advance is on the way. Blue annealed sheets are bringing 2.10c., Pittsburgh. Hot-rolled strip up to 2 in. ranges from 2.20c. to 2.25c., Pittsburgh, and 6 in. and wider from 1.85c. to 1.90c. Alloy bar prices are quoted as follows:

Alloy steel bar prices are unchanged from those that have been shown on the page of "Mill Prices of Finished Iron and Steel Products," except for a downward revision on two items, now quoted as follows:

Nickel chrome vanadium (0.60 per cent nickel, 0.50 per cent chrome, 0.15 per cent vanadium) .....$4.05 to $4.20, base per 100 lb.
Chromium molybdenum bars (0.50-0.70 per cent chromium, 0.15-0.25 per cent molybdenum), $3.05 to $3.10, base per 100 lb.

The recent advance in prices on structural shapes, bars and plates seems to be holding. In fact, 1.80c. per lb., Pittsburgh, is now being quoted only on large lots, while 1.90c. is quoted for carloads and less. Small-lot business in structural steel has been holding up remarkably well.

It is understood that legal obstructions which have thus far postponed the taking of bids on the Stock Realty Building, Detroit, have been cleared up, and bids for approximately 3300 tons of steel for its erection will be called for in the immediate future.

Old Material.—There has been a decidedly different feeling in the market during the past week, advances of 25c. per ton being noted in borings and short turnings and hydraulic compressed sheets. While mills and furnaces have not actually bought, there are evidences of purchases being imminent. The showing of the Ford cars has been a stimulus in this district to all other manufacturers, and there is a general feeling of optimism as to first quarter production.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.75 to $12.25
Borings and short turnings	8.75 to 9.25
Long turnings	7.50 to 8.00
No. 1 machinery cast	16.00 to 17.00
Automobile cast	18.00 to 19.00
Hydraulic compressed sheets	10.25 to 10.75
Stove plate	11.50 to 12.50
No. 1 busheling	9.00 to 9.50
Sheet clippings	7.50 to 8.00
Flashings	9.75 to 10.25

REINFORCING STEEL

Awards Total About 3800 Tons and New Work Up for Bids Exceeds 5000 Tons

Awards of concrete reinforcing bars in the week were about 3800 tons, while inquiries reach a total of 5100 tons, including 3000 tons for a factory building in Chicago. Awards follow:

ALBANY, N. Y., 170 tons, highway viaduct, to Concrete Steel Co.

NEWARK, N. J., 800 tons, viaduct for New Jersey State Highway Department; from O'Neill Co., general contractor, to Igoe Brothers.

NEWARK, 200 tons, bridge over Newark Bay for Pennsylvania and Lehigh Valley railroads; from Henry Steeres, Inc., general contractor, to Kalman Steel Co.

PITTSBURGH, 100 tons, Iron City Electric Co. building, to Carlem Engineering Co., Pittsburgh.

BUENA VISTA, GA., tonnage unstated, Mercy Home to Connors Steel Co., Birmingham.

MONTGOMERY, ALA., 150 tons, miscellaneous projects on State highway work, to Connors Steel Co.

CHICAGO, 110 tons, building for American Bulb Co., to Concrete Engineering Co.

ST. LOUIS, 865 tons, building for National Candy Co.; previously reported as going to Laclede Steel Co., to Truscon Steel Co.

ST. LOUIS, 1550 tons; 950 tons, including 750 tons for piling, addition to Prospect Hill plant of Missouri Portland Cement Co., and 600 tons, addition to Hotel Jefferson, to Laclede Steel Co.

LOS ANGELES, 397 tons, for Los Angeles County Flood Control District, to Pacific Coast Steel Co.

OAKLAND, CAL., 200 tons, Grove Street Wharf, to Frederick Steel Co.

BERKELEY, CAL., 100 tons, garage, to Gunn, Carle & Co.

Reinforcing Bars Pending

CHICAGO, 3000 tons, factory building for Campbell Soup Co.

CHICAGO, 500 tons, pumping station for Division B, sanitary district.

CHICAGO, 500 tons, Passavant Hospital.

CHICAGO, 500 tons, office building at Chestnut Street and Michigan Avenue; Holabird & Roche, architects.

CHICAGO, 440 tons, Kelly junior high school; new figures being taken.

CHICAGO, 440 tons, Forman public school; J. W. Snyder, low bidder.

LOS ANGELES, 162 tons for Los Angeles County; Soule Steel Co., low bidder.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Dec. 6	Dec. 5	Dec. 3	Dec. 2	Dec. 1	Nov. 30
Lake copper, N. Y.	14.12½	14.12½	14.00	14.00	13.87½	13.75
Electrolytic copper, N. Y.*	13.75	13.75	13.75	13.75	13.62½	13.50
Straits tin, spot, N. Y.	59.00	59.12½	....	58.75	59.05	58.75
Lead, New York	6.55	6.55	6.55	6.55	6.50	6.45
Lead, St. Louis	6.37½	6.37½	6.37½	6.37½	6.35	6.30
Zinc, New York	6.20	6.22½	6.20	6.20	6.20	6.25
Zinc, St. Louis	5.85	5.87½	5.85	5.85	5.85	5.90

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Dec. 6.—Copper prices are again higher and the market is strong. Activity in tin has been good at sustained prices. Further advances have been made in lead, but the zinc market is a little easier.

Copper.—Foreign buying continues the prominent feature of the market. Russia was added last week to the foreign countries and sales recently have again been very high. It is estimated that sales thus far in December have been nearly equal to the rate during the last few months and it is expected that they will continue large this month. There has also been some substantial buying by domestic consumers, many of whom evidently feel that they have overstayed the market. Electrolytic copper cannot be bought today at less than 14c., delivered, with some producers asking 14.10c. to 14.12½c. The market is easily ¼c. higher than a week ago. The quotation of Copper Exporters, Inc., has been advanced three times within the last week. Yesterday it was moved up from 14.25c. to 14.35c., c.i.f. Hamburg. The advances have not interfered with buying. Lake copper is quoted at 14.12½c. to 14.25c., delivered.

Copper Averages.—The average price of Lake copper for the month of November, based on daily quotations of THE IRON AGE, was 13.60c., delivered. The average price of electrolytic copper was 13.34c., refinery, or 13.59c., delivered.

Tin.—Sales for the week ended Saturday, Dec. 3, were about 1500 tons, with the most active days on Nov. 28, 29 and Dec. 2. Yesterday, Monday, about 250 tons changed hands, but today the market was very dull. Spot Straits tin today was quoted at 59c., New York, with fluctuations during the week very small. Statistics for November show deliveries into consumption at 5665 tons, with 2003 tons in stock and landing on Nov. 30. There was a moderate decrease in the visible supplies during the month, whereas an increase had been expected. The result has been a better tone. Prices abroad are higher this week, with spot standard quoted today in London at £269 15s., future standard at £265 10s. and spot Straits at £274 15s. The Singapore price today is £270 5s. The arrivals thus far this month have been 150 tons, with 4890 tons reported afloat.

Lead.—The leading interest on Dec. 1 again advanced its New York contract price from 6.40c. to 6.50c. The outside market has been correspondingly strong and is even a little higher, with sales made by independents in this district at 6.55c. The St. Louis price is 6.37½c. Buying has been generally heavy for December and January. Today the London price is down about $2 a ton and this may have some effect on this market, at least to check the rapid advance which has taken place.

Zinc.—Considerable business has been done in the last week, both for December and early next year's delivery, but in some cases at the expense of prices. The market for prime Western, which was 5.90c., St. Louis, a week ago, is now 5.85c., due to competition for orders. Ore prices were unchanged on Saturday at $37, Joplin. Production was again high at 13,000 tons and sales were low at 6800 tons.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 39c. per lb.

Antimony.—The market is stronger and Chinese metal is quoted at 11.50c. for spot delivery and 11.75c. for futures.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 25c. per lb., delivered.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	61.00c. to 61.50c.
Tin, bar	63.00c. to 64.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	7.75c. to 8.75c.
Lead, American pig	7.65c. to 8.65c.
Lead, bar	9.90c. to 10.90c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	39.25c. to 40.25c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	64.75c.
Tin, bar	65.50c.
Copper, Lake	14.50c.
Copper, electrolytic	14.50c.
Copper, casting	14.00c.
Zinc, slab	7.75c.
Lead, American pig	7.25c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	19.75c.
Babbitt metal, high grade	67.75c.
Solder, ½ and ½	38.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products were advanced ¼c. on Dec. 2. Lead full sheets were advanced ¼c. on Dec. 1 and are now being quoted at 10c. to 10.25c. There has been no change in the quotation on zinc sheets since Aug. 5.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	19.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

Non-Ferrous Metals at Chicago

DEC. 6.—Sales are more numerous and prices have advanced. Consumer interest still remains at close range and only a small tonnage has been sold for delivery in January. More life is indicated in the old metal market.

Prices, per lb., in carload lots: Lake copper, 14.12½c.; tin, 61.50c.; lead, 6.50c.; zinc, 5.95c.; in less-than-carload lots, antimony, 13c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 13c.; all being dealers' prices for less-than-carload lots.

FABRICATED STRUCTURAL STEEL

Awards Total 38,000 Tons, While Negotiations Are On for 46,000 Tons

Structural steel awards jumped to 33,000 tons in the past week, not including a 5000-ton job in Montreal. A department store addition in New York takes 7000 tons and other miscellaneous work in New York calls for nearly 17,000 tons. Negotiations are on for about 46,000 tons, of which 28,000 to 33,000 tons is represented by projects in Toronto, Ont. Awards follow:

BUFFALO, 180 tons, school building, to Kellogg Structural Steel Co.

CLEVELAND, 300 tons, building for Sisters of St. Joseph, to National Iron & Wire Co.

PERTH AMBOY, N. J., 250 tons, factory for Huff Airplanes, Inc., to Standard Erecting Corporation.

MONTREAL, 5000 tons, Bell Telephone Building, to Dominion Bridge Co.

BROCKTON, MASS., 100 tons, Knights of Columbus Building, Ralph P. Jackson to E. A. Simpson, Boston.

BOSTON, 200 tons, Boston Elevated Railway bus terminal, to Boston Bridge Works, Inc.

NEW YORK, 16,790 tons in the following awards as reported to the Structural Steel Board of Trade, Inc.: Apartment buildings at 11 West Sixty-ninth Street and at Eighty-third Street and West End Avenue, to D. & M. Construction Co.; Nassau Community Hospital at Rockville Center, N. Y., to Lehigh Structural Steel Co.; Sarah Lawrence College at Yonkers, N. Y., Crawford Memorial Church on 218th Street, Christian Science Church at Great Neck, N. Y., school building at Port Washington, N. Y., apartment building at Eighty-first Street and West End Avenue, Y. M. C. A. at Westfield, N. J., and United States Appraisers' Stores at Varick and Hudson Streets, to McClintic-Marshall Co.; addition to Knickerbocker Hospital and 15-story apartment building at 528 East Eighty-sixth Street, to Levering & Garrigues Co.; storehouse at Greenwich and Morton Streets, warehouse at 313 Ashland Place and Pythian Home at 923 Eastern Parkway, Brooklyn, to George A. Just Co.; freight shed at Newark, N. J., for Lehigh Valley Railroad, to Hedden Iron Construction Co.; apartment buildings at Fifth Avenue and Ninety-fourth Street, at Lexington Avenue and Seventy-ninth Street, at 16 West Seventy-seventh Street and at 447 East Fifty-seventh Street, to Harris Structural Steel Co.; apartment buildings at Fifty-eighth Street and Sutton Place and at Riverside Drive and Seventy-fifth Street, to Paterson Bridge Co.; Hotel Equity at Scarsdale, N. Y., and Valencia Theater at Jamaica, N. Y., to Shoemaker Bridge Co.

BROOKLYN, 560 tons, Brooklyn Central Library building, to Fort Pitt Bridge Works.

NEW YORK, 7000 tons, addition to Arnold Constable & Co.'s department store on Fifth Avenue, to American Bridge Co.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.50c.	13.00c.
Copper, heavy and wire	11.375c.	12.625c.
Copper, light and bottoms	9.50c.	10.75c.
Brass, heavy	7.00c.	8.50c.
Brass, light	5.75c.	7.25c.
Heavy machine composition	9.25c.	10.75c.
No. 1 yellow brass turnings	7.75c.	8.50c.
No. 1 red brass or composition turnings	8.50c.	9.50c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	4.25c.	4.75c.
Zinc	3.75c.	4.25c.
Sheet aluminum	13.00c.	15.00c.
Cast aluminum	12.75c.	14.75c.

READING RAILROAD, 400 tons, bridge over Raritan Canal, to Bethlehem Steel Co.

NEWARK, N. J., 600 tons, Presbyterian Hospital, to Goeller Construction Co.

BALTIMORE, 900 tons, apartment building, to an unnamed fabricator.

SYLACAUGA, ALA., 150 tons, Avondale Mills, to Ingalls Iron Works Co., Birmingham.

FOSTORIA, OHIO, 100 tons, factory building for National Carbon Co., to McClintic-Marshall Co.

DETROIT, 2000 tons, Book garage, to Russell Wheel & Foundry Co.

DETROIT, 300 tons, Chrysler enameling plant, to Whitehead & Kales.

CHICAGO, 275 tons, buildings in LaFollette Park, to Gage Structural Steel Co., local.

CHICAGO, 160 tons, incinerator plant, to American Bridge Co.

WEVER, IOWA, 350 tons, Skunk River highway bridge, to American Bridge Co.

MELVILLE, LA., 1000 tons, bridge for Texas & Pacific, to Missouri Bridge & Iron Co., St. Louis.

BOONE, IOWA, 400 tons, bridge, to Pittsburgh-Des Moines Steel Co.

HOQUIAM, WASH., 600 tons, pulp plant, to McClintic-Marshall Co.

SAN QUENTIN, CAL., 200 tons, cell house, to Palm Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 290 tons, transit department.

BATH, ME., 670 tons of plates and shapes for a yacht.

BOSTON & MAINE RAILROAD, 2000 tons, bridges for rehabilitation of lines damaged by floods in New England.

NEW YORK, 6000 tons, warehouse on 140th Street, Bronx.

NEW YORK, 500 tons, theater in the Bronx.

NEW YORK, 700 tons, apartment building at East End Avenue and Eightieth Street.

NEW YORK, 200 tons, factory building at 150th Street and East River.

BROOKLYN, 500 tons, apartment building on Montgomery Place.

CAMDEN, N. J., 500 tons, First National Bank.

PHILADELPHIA, 450 tons, theater.

FAYETTE COUNTY, W. VA., 650 tons, highway bridge.

LAWRENCE COUNTY, PA., 600 tons, highway bridge.

TORONTO, ONT., 10,000 to 15,000 tons for King-Adelaide Corporation.

TORONTO, 10,000 tons, Holt-Gundy office building.

TORONTO, 8000 tons, Yolles & Rottenberg building, Richmond and Bay Streets.

LOUISVILLE, KY., 1500 tons, steel piling for Ohio River dam No. 53; United States engineer office will receive bids until Dec. 17.

CHICAGO, 650 tons, building for Campbell Soup Co.

CHICAGO, 1200 tons, superstructure for Robey Street lift bridge; Stroebel Steel Construction Co. low bidder on general contract.

CHICAGO, 1800 tons, superstructure for Clark Street lift bridge; Ketler Elliott Co. low bidder on general contract.

SEATTLE, WASH., 900 tons, viaduct on Eighth Street for Union Pacific Railroad; general contract awarded to J. A. McEachern Co.

SAN FRANCISCO, 900 tons, apartment building on Union Street; bids being received.

PERSONAL

Arthur A. Fowler, of Rogers Brown & Crocker Brothers, Inc., New York, will resign from the presidency of that organization on Jan. 1 and will be succeeded by George A. Crocker, Jr., who is now vice-president. Mr. Fowler has been prominently identified with the pig iron industry for a number of years. He entered the firm of Rogers, Brown & Co. in 1905, and for most of the succeeding period up to the formation of Rogers Brown & Crocker Brothers, Inc., in 1925 was resident partner in New York. His office after Jan. 1 will be at 74 Trinity Place, New York. He will continue as a director of Rogers Brown & Crocker Brothers, Inc.

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Otto Horix, who recently resigned as general manager McKenna Brass & Mfg. Co., Pittsburgh, has taken over the Haller division of that company with a plant on Chartiers Avenue, Pittsburgh, and will operate it as the Horix Mfg. Co., continuing the present line of bottling machines for still liquids. Mr. Horix still is a stockholder in and a director of the McKenna Brass & Mfg. Co. and its affiliated company, the McKenna-Horix Mfg. Co.

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A. Roy Carson, controller Pittsburgh Valve Foundry & Construction Co., has joined the night faculty of the School of Accounting, University of Pittsburgh.

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P. E. Bliss and E. F. DuBrul, president and manager, respectively, of the National Machine Tool Builders Association, are conducting a series of regional meetings of the association in the various machine tool producing centers, at which many of the problems of the industry are being discussed. Meetings were held in Rockford, Ill., on Nov. 15, in Cincinnati on Nov. 25, and in Cleveland, Dec. 2. At Springfield, Mass., a district conference is scheduled for Dec. 16, and one probably will be held in Rochester at a later date.

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John W. Harrington, Worcester, Mass., president of the Heald Machine Co., treasurer of the Harrington & Richardson Arms Co., and president and treasurer of the Stockbridge Machine Co., will sail for Europe Dec. 10, on a business trip which will include London, Paris and Berlin. He will be absent about five weeks.

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Dr. Ancel St. John has made arrangements to supervise all laboratory investigations for Herbert R. Isenburger, Inc., 63 Park Row, New York. This company has recently established an X-ray service for fault analyses and research materials, supplying what it believes is a long felt necessity of importance to metal and other industries.

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Elmore S. Pettyjohn has been appointed director of research work to be conducted by the Michigan Gas Association at the University of Michigan, Ann Arbor. He is a graduate of the university and has had experience with the Semet-Solvay Co., the Ford Motor Co., the Illinois Steel Co. and the Chicago By-Product Coke Co. Mr. Pettyjohn will have at his disposal the laboratory, and personnel resources in the department of chemical engineering of the university and will also have the assistance and counsel of Prof. Alfred H. White, head of that department.

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Reese Llewellyn, president of the Llewellyn Iron Works, Los Angeles, was honored at a dinner held at the University Club in that city on Nov. 22, in observance of the company's fortieth anniversary. Department heads presented him with a bronze tablet in appreciation of his work with the company. Other officials of the firm who were also honored were William Llewellyn, David Llewellyn, John Milner, Milton Baruch and Reese Taylor.

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Arthur J. Tuscany, secretary-manager of the Ohio State Foundrymen's Association, Cleveland, was the speaker at the monthly meeting of the Wisconsin Gray Iron Research Group, held at the Republican House, Milwaukee, on Dec. 7.

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R. E. Dow, for several years purchasing agent for the International Supply Co., Tulsa, Okla., has been made general sales manager.

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F. B. Sage, A. R. Foote and W. W. Montalvo, Jr., are officers of the Cochrane Sales Co., Inc., 50 Church Street, New York, which has been organized as sales representative of the Cochrane Corporation, Philadelphia, to succeed the late F. E. Idell, who represented the company in New York for a number of years.

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Robert J. Frank, vice-president in charge of sales for the Copperweld Steel Co., Rankin, Pa., will have his headquarters at the company's new mill at Glassport, Pa., following the removal of the sales and engineering departments of the company to that place. Stanton Hertz, formerly electrical engineer for the company, has been appointed sales manager and will be succeeded by Rolf Selquist, who has been assistant electrical engineer. William Jay McIlvane and Erich G. Elg have been appointed district managers at New York and Chicago, respectively. S. H. Burr, formerly inspector and line materials specialist at both the Buffalo and New York offices of the Graybar Electric Co., has become associated with the engineering department of the Copperweld company with headquarters in New York.

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Zeno C. Wilkinson, sales manager of the Youngstown Pressed Steel Co., Warren, Ohio, has resigned to become vice-president in charge of manufacturing and sales for the Peter Smith Heater & Mfg. Co., Detroit. He will also be part owner and a director of the company. Mr. Wilkinson has been in the steel business for a number of years, having been associated with the Gary works, Illinois Steel Co., and with the Bethlehem Steel Co., before going with the Warren company. The Peter Smith Heater & Mfg. Co. is a reorganization of the Peter Smith Heater Co., which has been operating in Detroit for 45 years as a manufacturer of heating units for steam railroad and electric cars. Under the reorganization the company will operate a pressed steel division for the manufacture of all kinds of pressed steel parts and a heater division which will carry on the business of the old company. An additional unit for the heater division will be constructed at 10501 Haggerty Avenue, Fordson, early in 1928. E. J. Smith is president of the new organization, and M. J. Phelan, secretary.

Z. C. WILKINSON

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J. B. Frisbie, for the last four years secretary of the American Chamber of Commerce of Cuba, has been appointed assistant manager of the foreign commerce department of the Chamber of Commerce of the United States, and will assume his new duties on Jan. 1. He was graduated in 1926 from the National School for Commercial and Trade Executives, Northwestern University, Chicago, and was engaged for some time in foreign service work for the National City Bank of New York in Argentina and Cuba.

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Ralph R. Silver, for the last 12 years advertising manager of the American Cast Iron Pipe Co., Birmingham, has become associated with the Cox Advertising Agency, Birmingham, and under plans of reorganization, will acquire an interest in the firm which is a specialist in industrial advertising and publicity.

G. F. Ziv and A. Ziv have been elected president and chairman, respectively, of the Ziv Steel & Wire Co., Chicago. A. F. Brunck has been appointed general sales manager with headquarters at Chicago. Other officers of the company are N. J. Hislip, vice-president; M. Foley, secretary, and H. E. Ziv, treasurer.

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Kent Harrison has resigned as superintendent of the open-hearth department, Lukens Steel Co., Coatesville, Pa. He has been with the company two years and previously held a similar position with the Donner Steel Co., Inc., Buffalo.

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James W. Furness, Jenkintown, Pa., employed for the past five years in the Bureau of Mines as a mining engineer, has been appointed chief of the Minerals division, Bureau of Foreign and Domestic Commerce, Department of Commerce, succeeding Marshall W. Tuthill, resigned.

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Robert Whyte, associated for a number of years with the Pittsburgh Piping & Equipment Co. and the American Foundry & Construction Co., has been added to the sales organization of the Pittsburgh Valve, Foundry & Construction Co., Twenty-sixth Street, Pittsburgh.

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Joseph B. Deischer has opened an office at 24 Roslyn Street, Rochester, N. Y., to engage in consulting work for the malleable and gray iron foundry industries. He was for three years assistant consulting engineer for the American Malleable Castings Association and the Malleable Iron Research Institute and recently spent several months in Europe as consulting foundryman. He will specialize particularly in the application of pulverized coal to malleable foundries and the investigation of sand problems.

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C. N. Thulin, vice-president of the Duff Mfg. Co., Pittsburgh, manufacturer of lifting jacks, has taken over the supervision of the company's Eastern sales district in addition to the Western district of which he has had charge for several years. His headquarters will be at New York and Chicago. W. G. Robb has been appointed New York district manager with headquarters at 250 Park Avenue, and E. E. Thulin has been made Chicago district manager with headquarters in the Peoples Gas Building. P. G. O'Hara, former vice-president in charge of the Eastern district, has resigned to join the Vacuum Oil Co., New York.

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Dr. J. A. Mathews, vice-president Crucible Steel Co. of America, addressed the Cincinnati chapter of the American Society for Steel Treating on Dec. 1, his subject being the "Importance of Chromium in Alloy Steel Metallurgy."

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Walter Troop, sales manager of the North & Judd Mfg. Co., New Britain, Conn., has resigned to become vice-president of the O. B. North Co., Inc., New Haven, Conn.

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H. G. Austin, formerly New England representative of the Central Iron & Steel Co., Harrisburg, Pa., and the Apollo Steel Co., Apollo, Pa., has been made assistant sales manager in New England for the Lukens Steel Co., Coatesville, Pa.

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H. G. Shumway was elected president of the Chicago Foundrymen's Association at the annual banquet and business meeting held at the Palmer House, Nov. 17.

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George E. Bergstrom, employment manager Pettibone-Mulliken Co., Chicago, will address the Chicago Foundrymen's Club, Dec. 10, on "Training Apprentices in the Foundry."

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C. L. F. Wieber, Jr., has been elected president of the Henkel-Clauss Co., Fremont, Ohio, manufacturer of cutlery, succeeding Paul E. Schaaf, who has resigned. Mr. Wieber has been treasurer of the company for some time, and with his father, C. L. F. Wieber, Sr., has purchased Mr. Schaaf's interest in the company.

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Ralph Hammersley, chief engineer of the Whitman-Barnes-Detroit Corporation, Detroit, has resigned and plans to take up tool engineering with headquarters at 2715 Rochester Avenue, Detroit. Prior to the merger of the Detroit Twist Drill Co. and the Whitman & Barnes Mfg. Co. as the Whitman-Barnes-Detroit Corporation, he was associated for four years with the Whitman & Barnes organization as chief inspector and superintendent.

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Judge Elliott M. Wilson, president for many years of the Pacific Coast Steel Co., who died recently at San Francisco, left $100,000 to Hiram College at Hiram, Ohio, from which he graduated 60 years ago. The will also provides that the bulk of the estate (upward of $1,000,000) be held in trust for 10 years. At the expiration of the trust, 20 per cent will go to the California Institute of Technology.

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Walter C. Carroll, since Aug. 1, 1927, president of the National Association of Sheet and Tin Plate Manufacturers, Pittsburgh, has been elected president of the Oil Well Supply Co., Pittsburgh. Previously he was for six years vice-president of the Inland Steel Co., Chicago, having gone to the Inland organization from the American Sheet & Tin Plate Co. of which he was assistant general manager of sales with headquarters at Pittsburgh. He succeeds Louis Brown, who has been indentified with the Oil Well Supply Co. for 36 years, the last 16 as president, and who has been elected chairman of the board. Changes are effective Jan. 15.

RAILROAD EQUIPMENT

New Inquiry for Close to 6000 Freight Cars, Also Passenger Cars

Inquiry for close to 6000 freight cars, in addition to underframes and passenger equipment, brings the total of freight cars pending to 10,000, the largest amount of work that car builders have had under consideration in many months. Details of inquiries and orders follow:

The Southern Railway will buy 25 Mikado, 5 Pacific and 8 Mallet type locomotives.

The Boston & Maine has revived an inquiry for 25 or 30 locomotives.

The Southern Railway has inquired for 3950 items of freight-carrying equipment and 25 passenger cars as follows: 1000 steel hopper cars, 1000 box cars, 500 gondola car bodies, 250 ballast cars, 200 caboose cars, 23 baggage-mail cars and two mail cars.

The Louisville & Nashville has issued its expected inquiry for 1250 steel drop-bottom gondola cars, 200 mill gondolas, 200 stock cars, 200 automobile cars and 300 box cars; also eight coaches, six passenger-baggage cars and two baggage cars.

The Bangor & Aroostook is in the market for 100 box cars.

The Atlantic Coast Line is inquiring for 78 steel underframes for freight cars.

The Lehigh & New England will buy six caboose cars.

The Long Island has inquired for 10 baggage cars and two baggage-mail cars.

The Pacific Fruit Express is getting prices on 300 to 600 steel underframes.

The Texas & Pacific has inquired for 500 gondola cars, 200 flat cars and 200 automobile cars.

In addition to orders reported last week as having been placed by the Chicago & North Western, this road has bought 100 70-ton gondola cars and 25 caboose cars from the American Car & Foundry Co. and 100 caboose car underframes from the Illinois Car & Mfg. Co.

First Melville Medal Awarded to L. P. Alford

A feature of the program of Tuesday evening, Dec. 6, at the 48th annual meeting of the American Society of Mechanical Engineers in New York was the presentation of the Melville medal to Leon P. Alford, editor of *Manufacturing Industries*. The medal was instituted and endowed by the late Rear Admiral George W. Melville for the principal professional paper presented to the society in the calendar year. Mr. Alford is the first to receive the medal, and the award was made for his paper on "Laws of Manufacturing Management," presented at the 47th annual meeting of the society held in New York in December, 1926. The paper attracted much attention and in the discussion following its presentation it was referred to as the first comprehensive statement of the fundamentals of industrial management. Mr. Alford received his college training at Worcester Polytechnic Institute, and later was connected with the United Shoe Machinery Co.'s plant at Beverly, Mass., as chief mechanical engineer. In 1907 he joined the editorial staff of the *American Machinist*, and from 1911 to 1917 was editor-in-chief. For three years following he was editor of *Industrial Management* and then became connected with the Ronald Press Co., publisher of *Manufacturing Industries*. He wrote the report of the A. S. M. E. committee to investigate scientific management, and was first chairman of the management division of the society. In more recent years he has served on research committees of the American Engineering Council, particularly those dealing with waste in industry and with the 12-hr. day. He made an important contribution to engineering in the editing of "Management's Handbook," which was brought out in 1925.

L. P. ALFORD

Exchange Paper Authors for Meetings of European Foundry Associations

John Howe Hall, metallurgist Taylor Wharton Iron & Steel Co., High Bridge, N. J., and H. A. Schwartz, director of research National Malleable & Steel Castings Co., Cleveland, have been chosen by the American Foundrymen's Association to present two of the American Foundrymen's Association exchange papers before 1928 meetings of the European foundry associations.

Mr. Hall will present the exchange paper before the next annual meeting of the Institute of British Foundrymen and Mr. Schwartz the paper before the meeting of the Association Technique de Fonderie de France, the French foundry association corresponding in its activities to the American Foundrymen's Association.

John W. Bolton, metallurgist for the Lunkenheimer Co., Cincinnati, has been chosen to present the 1929 A. F. A. exchange paper before the Institute of British Foundrymen. The 1929 meeting of the Institute of British Foundrymen will be the third international foundry congress, the first being held in Paris in 1923 and the second in Detroit in 1926.

OBITUARY

CARL EICKEMEYER, consulting engineer and inventor, died Dec. 2 at his home in Brooklyn, aged 58 years. He was born at Yonkers, N. Y., and following graduation in electrical and mechanical engineering from Cornell University, he was associated with his father in the Eickemeyer Field Mfg. Co., Yonkers, which was later merged into the General Electric Co. Among his inventions were automatic pumps, a single weight disappearing gun carriage, an improved steel cross tie for electric railroads, a shockless rail joint to eliminate car vibrations, a high speed third rail and a high tractive powered electric locomotive. He was a member of the American Society of Mechanical Engineers and the Society of American Military Engineers.

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WILLIAM BYRON RUFE, secretary of Jenkins Brothers, New York, and of Jenkins Brothers, Ltd., the company's Canadian subsidiary, died on Nov. 27 at his home in Brooklyn, aged 56 years. He had held the secretaryship of the company since its incorporation in 1907, and next month would have completed 40 years' service with the organization.

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LOUIS E. WHITE, vice-president and treasurer of the Gale Mfg. Co., Albion, Mich., died on Nov. 3 at his home in Albion.

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HARRIS WHITTEMORE, chairman of the Eastern Malleable Iron Co., Naugatuck, Conn., died on Nov. 29 at his home in that city, following an illness of two weeks. He was born at Naugatuck 62 years ago and attended Phillips Academy, Andover, Mass., later studying in Germany for two years. Upon returning to this country he located in Cleveland, making a thorough study of the malleable iron business in which his father was engaged. Later he returned to Connecticut and became actively associated with the business of which he was the head at the time of his death. He was also treasurer and director of the Bristol Co., Platts Mills, Conn., and a director of numerous other companies, including the American Hardware Co., New Britain, Conn.; the Blake & Johnson Co., Waterbury, Conn.; the Colonial Trust Co., Waterbury; the Dime Savings Bank, Waterbury; the Eberhard Mfg. Co., Cleveland; the Hartford & New York Transportation Co.; the J. H. Whittemore Co., Naugatuck; Landers, Frary & Clark, New Britain; the Link-Belt Co., Chicago; the Manufacturers' Foundry Co., Waterbury; the National Malleable & Steel Castings Co., Cleveland; the New York, New Haven & Hartford Railroad Co., and many other organizations.

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ARTHUR F. BLASDELL, former works manager of the Pittsfield, Mass., plant, General Electric Co., died suddenly Nov. 28 at Santa Ana, Cal. He was born at Freeport, Ill., 56 years ago, and was works manager of the Pittsfield plant for 16 years, retiring on Dec. 20, 1926.

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HARRY W. KNIGHTS, president of the Massachusetts Machine Shop and other Boston corporations, died last week at his home in Littleton, Mass., aged 57 years.

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LUTHER V. RICE, who until about a year ago was chief engineer and director of the Robert W. Hunt Co., consulting engineer, Chicago, died Nov. 26 at Glendale, Cal., aged 66 years. He was a graduate of Cornell University.

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W. W. RAMSAY, foreign sales manager J. I. Case Threshing Machine Co., Racine, Wis., died Nov. 30 following a brief illness. He was 59 years of age and a native of Trenton, Tenn. He joined the Case company in 1892 and was placed in charge of foreign sales about 15 years ago.

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MERWIN MCKAIG, president Cumberland Steel Co., Cumberland, Md., died on Dec. 4, following a year's illness. He was 78 years of age and had been prominently identified with manufacturing and banking establishments in Cumberland during his entire business career.

European Export Prices Still Low

Japan Buys Welsh Tin Plate—Ferrosilicon Syndicate to Maintain Foreign Stocks—Steel Cartel Will Meet on Friday

(*By Cable*)

LONDON, ENGLAND, Dec. 5.

DEMAND for Cleveland pig iron has been stimulated somewhat by the recent 2s. 6d. (61c.) reduction to domestic users, but export business is still generally quiet. Cleveland producers are now endeavoring to eliminate merchants by establishing a sales office in Glasgow for Scottish business only and refusing to sell to Scottish merchants.

There are 39 Cleveland furnaces in blast since the Lilleshall Co., Ltd., has blown out the furnaces at Priors Lee Hall, Shifnal. Hematite prices are easy, but stocks are decreasing. Foreign ore is still dull.

Finished steel is quiet and the outlook is not favorable. Domestic demand is expanding, but export sales are negligible and plate mills, especially, are in need of business. The Stavely Coal & Iron Co., Ltd., is operating its pipe foundries only three days a week and the South Durham Steel & Iron Co., Ltd., has closed its plate mills at Stockton-on-Tees.

Tin plate prices are firm and there is a fair volume of business, although activity has declined somewhat with works in a better position. Galvanized and black sheets are quiet.

The revised Australian tariffs on iron and steel are meeting with considerable disapproval.

Continental iron and steel markets are quiet, but sellers are firm in maintaining prices. The deliberations of the International Steel Cartel at its meeting on Friday are awaited with interest, as among the possible subjects of discussion is the proposed establishment of sales offices for semi-finished material and beams. The European Rail Makers' Association also meets in Brussels on Friday. The western European pig iron entente has been prolonged until January, 1929.

A railroad in Manchuria is reported to have purchased 51,000 tons of rails from the European Rail Makers' Association. The Acieries D'Angleur, Tilleur Belgium, has blown in its fifth furnace.

The French output in October was 796,000 metric tons of pig iron and 723,000 metric tons of steel ingots. The German steel ingot output in October was 1,414,000 metric tons.

Lockout Threatened by German 8-Hr. Day Controversy

(*By Radio*)

BERLIN, GERMANY, Dec. 5.

The Western steel mills have collectively given notice of a general lockout effective Jan. 1. This is the result of differences over wage scales, arising from the 8-hr. day law, which must be applied by rolling mills the first of the year.

The domestic iron and steel prices of all syndicates are unchanged for December. Inquiry for steel is active, but the volume of new orders has slightly declined.

Pig iron purchasing is satisfactory in the domestic field, but export business is depressed by the keen competition of other producing countries. Inquiry for semi-finished material is growing.

Movement of steel bars is good, with mills in most cases offering delivery terms up to three months. In the export market, prices for steel bars are firmer but demand for structural shapes is smaller. Recently some large orders for heavy gage sheets have been booked from shipyards. The tendency of medium and thin gage sheets is irregular. The market on steel tubes is weaker.

German Pig Iron Syndicate Shows No Interest in Export

HAMBURG, GERMANY, Nov. 19.—The German Pig Iron Syndicate has almost completely ceased export selling of pig iron. Recently inquiries and even firm offers for No. 2, No. 3 foundry and Bessemer iron as well as hematite have been refused. The syndicate shows interest only in offers for export of No. 1 foundry and spiegeleisen. This position has evidently been

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0	17½s.			$4.27		
Bilbao Rubio ore*..	1	1			5.11		
Cleveland No. 1 fdy.	3	7½			16.44		
Cleveland No. 3 fdy.	3	5			15.83		
Cleveland No. 4 fdy.	3	4			15.59		
Cleveland No. 4 forge	3	3½			15.46		
Cleveland basic (nom.)	3	15	to £3	15½s.	18.27	to	$18.39
East Coast mixed...	3	11			17.29		
East Coast hematite	3	11½			17.42		
Rails, 60 lb. and up.	7	15	to 8	0	37.75	to	38.96
Billets	6	0	to 6	10	29.22	to	31.66
Ferromanganese ...	13	0			63.31		
Ferromanganese (export)	11	10	to 12	0	56.01	to	58.44
Sheet and tin plate bars, Welsh	5	7½	to 5	15	26.18	to	28.01
Tin plate, base box..	0	17¾	to 0	18¼	4.32	to	4.44
Black sheets, Japanese specifications.	13	5	to 13	10	64.53	to	65.75
					C. per Lb.		
Ship plates	7	12½	to 8	2½	1.66	to	1.77
Boiler plates	10	10	to 11	0	2.28	to	2.39
Tees	8	2½	to 8	12½	1.77	to	1.99
Channels	7	7½	to 7	17½	1.60	to	1.71
Beams	7	2½	to 7	12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7	5	to 7	15	1.58	to	1.69
Steel hoops	10	10	to 11	0	2.28	to	2.39
Black sheets, 24 gage	10	5	to 10	10	2.23	to	2.28
Galv. sheets, 24 gage	13	2½	to 13	5	2.85	to	2.88
Cold rolled steel strip, 20 gage, nom.	14	0	to 14	5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

	(Per Metric Ton)						
Foundry pig iron: (a)							
Belgium	£3	0s.	to £3	1s.	$14.61	to	$14.85
France	3	0	to 3	1	14.61	to	14.85
Luxemburg	3	0	to 3	1	14.61	to	14.85
Basic pig iron:							
Belgium	2	17½	to 2	19	14.01	to	14.38
France	2	17½	to 2	19	14.01	to	14.38
Luxemburg	2	17½	to 2	19	14.01	to	14.38
Coke	0	18			4.39		
Billets:							
Belgium	4	4	to 4	6	20.46	to	20.94
France	4	4	to 4	6	20.46	to	20.94
Merchant bars:					C. per Lb.		
Belgium	4	16	to 4	17	1.06	to	1.07
France	4	16	to 4	17	1.06	to	1.07
Luxemburg	4	16	to 4	17	1.06	to	1.07
Joists (beams):							
Belgium	4	8	to 4	10	0.97	to	0.99
France	4	8	to 4	10	0.97	to	0.99
Luxemburg	4	8	to 4	10	0.97	to	0.99
Angles:							
Belgium	4	15			1.05		
⅛-in. plates:							
Belgium (a)	6	4	to 6	5	1.37	to	1.38
Germany (a)	6	4	to 6	5	1.37	to	1.38
⅜-in. ship plates:							
Belgium	5	19	to 6	0	1.32	to	1.33
Luxemburg	5	19	to 6	0	1.32	to	1.33
Sheets, heavy:							
Belgium	6	1			1.34		
Germany	6	1			1.34		

(a) Nominal.

taken because of the low level of the export market prices.

Announcement has been made that domestic prices will be unchanged to the end of the year, and it is estimated that the home market will be able to absorb the entire production for the present as well as a moderate tonnage of foreign iron. Recently imports of pig iron have exceeded exports.

JAPAN BUYS WELSH PLATES

Sheets Also Ordered of British Mills—Manchurian Rail Order

NEW YORK, Dec. 6.—Export business continues small, with a large part of current Japanese purchasing going to British mills. The 69,000 base boxes of oil can tin plate for the Nippon Oil Co. is reported to have been placed with Welsh makers, whose export quotations are considerably under the present American export market. Quotations for export of mills in the United States were recently advanced on tin plate. British tin plate prices are reported to be at about £1 ($4.87) per base box, c.i.f. Japan, so that even with as much as 25c. per base box added as the preferential price Japanese consumers are sometimes willing to give American mills, the price here is considerably out of line.

British sales of light gage black sheets have also been fairly satisfactory lately, with the British export market to Japan about $5 per ton, c.i.f. Japanese port, under the American price of about $80 per ton, delivered. The British sheet mills, however, are reported to be well booked with business and unable to quote for shipment until into January. In this situation, should the Japanese Diet at its session late this month pass the proposed tariff increase on black sheets, which would almost double the present duty, speculative purchasing might be diverted to American mills, as British makers might be unable to ship sufficiently early to reach Japan before the advance became effective.

There is some activity in rails. Tokio municipality opened bids Dec. 5 on about 6 miles of 100-lb. high T-rails and 2 miles of guard rails, and Osaka municipality opened bids Dec. 4 on about 10 miles of 100-lb. high T-rails and guard rails. A recent sizable purchase of rails for the Far East was the 10,000 tons of 80-lb. sections for the Kiton Railway, a Chinese owned line in Manchuria. The tonnage is reported to have been placed with an American mill.

Importations of Steel Small

Importers of European steel in the United States continue rather inactive, especially since the recent advances in Continental export prices. Plain steel bars are quoted at 1.63c. to 1.68c. per lb., base, and beams at 1.53c. to 1.58c. per lb., base, c.i.f. Atlantic port. There is a moderate volume of sales of hot rolled hoops to cold rolling mills, but the margin of difference in price between European and domestic hoops is not so large now as a few weeks ago.

Ferrosilicon Syndicate to Maintain Stocks Abroad

HAMBURG, GERMANY, Nov. 19.—The Continental Ferrosilicon Syndicate, which includes producers in Switzerland, Germany, Austria, Czechoslovakia, Norway and the Saar, has decided to establish stocks in all the principal consuming centers. In the past, the wide fluctuations in prices, on the 25 and 75 per cent grades especially, have been caused by the absence of stocks at consuming points, so that the market was directly affected by a sudden increase or decrease in demand.

The syndicate also reports that a price increase is not planned and that competition from the French producers, who are not members of the syndicate, is declining. It is evidently intended to maintain a stock in the United States as well as in other foreign markets. The minimum quantities for these stocks will be 750 tons in Europe and 1000 tons in the United States. It is estimated that 1000 tons is representative of about 6 weeks' imports for American consumption.

BELGIAN PRICES FIRM

Dull Market Considered as Usual Year-End Quiet—Mills Are Well Booked

ANTWERP, BELGIUM, Nov. 19.—The recent active buying seems to have reached a temporary lull, with most consumers well covered for the present. Prices, however, continue fairly firm as a resumption of purchasing seems to be expected by the mills. Sellers are still asking higher prices than consumers are willing to pay, so that a good deal of the present business is at slight concessions. Purchasers are inclined to await the slightly lower price level that usually develops toward the end of the year. Deliveries, however, are extended so that mills are in a position to maintain an independent attitude. While a considerable increase in domestic and foreign business is not expected immediately, the reduction in production quotas sanctioned by the International Steel Cartel is beginning to have an effect. With output closer to actual demand, prices are being maintained more successfully than for some time.

Pig Iron.—Both domestic and export business is satisfactory and export prices have increased. The greater part of the sales for foreign shipment are at £3 ($14.61) per metric ton, f.o.b. Antwerp, for No. 3 phosphoric foundry iron. Bessemer hematite is quoted at 640 to 660 fr. ($25.15 to $25.94) per ton to domestic users, but there is severe competition from French furnaces, which are offering lower prices.

Semi-Finished Material.—Buying is confined to small lots for immediate shipment and the future of the market seems rather uncertain. Mills are still well booked so that only a few are actively seeking tonnage. Blooms are quoted at about £4 ($19.48) per ton for 6-in. and larger and £4 2s. ($19.97) per ton for 4-in., f.o.b. Antwerp. Billets range from £4 5s. ($20.70) per ton for 3 to 4-in. to £4 6s. ($20.94) per ton for 2 to 2½-in., f.o.b. Antwerp.

Finished Material.—Although the volume of current purchasing is small, it is evidently large enough to permit maintenance of the price level fairly well. There has been a tendency to advance prices and in some instances these advances have apparently been too rapid to be successfully maintained. Bars, particularly, have been quoted at high prices as a result of the scarcity of stocks for prompt shipment, caused by the drastic reduction of output by most mills. As makers are rather well booked with future business, it is doubted in many quarters that the usual year-end quiet will develop. The lowest quotation on bars is evidently £4 16s. per ton (1.06c. per lb.), and sales are reported at £4 17s. to £4 18s. per ton (1.07c. to 1.08c. per lb.). Reinforcing bars are quoted at about £5 2s. 6d. per ton (1.13c. per lb.). Beam prices are strong and show a tendency to advance with quotations at £4 8s. to £4 10s. per ton (0.97c. to 0.99c. per lb.), f.o.b. Antwerp. Steel hoops, however, are less active than formerly and concessions are not uncommon, with the market at about £5 10s. per ton (1.21c. per lb.). The sheet market is well maintained, with most makers in a fairly independent position.

New Tube Works and Rolling Mills in Germany

HAMBURG, GERMANY, Nov. 19.—Expansion in the German steel industry continues of considerable importance. The Peiner Walzwerke, Peine, near Hanover, has erected a new rolling mill with a capacity of 15,000 metric tons a month and the Vereinigte Stahlwerke A. G. has almost completed a new rolling mill at Dortmund. The Mannesmann Tube Co., which recently purchased the tube mill of the Rumpel A. G. in Austria, plans to erect a large new tube mill, which will be devoted to production of pipe for export to the Near East. The Rheinische Westfaelische Eisen und Stahlwerke has begun the construction of a new rolling mill at Gelsenkirchen and the Kloeckner interests are also planning new mills. One of the oldest German blast furnaces, the Haigerer Huette, has been blown out and will be dismantled. To offset this, a new blast furnace is to be erected by the Stumm interests.

Machinery Markets and News of the Works

SOME PRICES ADVANCED

Milling Machines, Shapers and Grinding Machines Up About 10 Per Cent

Business Still of Spotty Character, Showing Little, if Any, Gain—A Slowing Down of Buying in Some Sections

FOLLOWING the recent advances in lathes, some manufacturers of milling machines, shapers and cylindrical grinding machines have put up prices approximately 10 per cent, presumably to cover rising costs, due partly to reduced volume of buying.

Reports vary as to the state of trade, but generally the trend is slightly downward, a condition not unexpected at the close of a year, when efforts are made to keep inventories at a low point. A few machinery companies did as well in November as in October, but for a majority November sales were below those of the preceding month.

The Chicago market has been somewhat disturbed by the offering for sale of 800 used machines from the plant of the Marmon Motor Car Co., Indianapolis.

In the territory contiguous to the Michigan automobile manufacturing district, business in some metal-working lines is improved, following the release of orders for stampings and other parts for automobiles.

New York

NEW YORK, Dec. 6.

REPORTS of the state of machine tool business vary, indicating, as in the past few weeks, the spotty character of buying. Some local selling offices did better in November than in October, while others did not do so well. Inquiries are more numerous in some offices, while fewer in other offices. It is perhaps accurate to say that business as a whole has shown little variation one way or the other in the past several weeks. Some manufacturers of milling machines and cylindrical grinding machines have announced price advances approximating 10 per cent.

Among the week's purchases were the following: Five Barnes gear shaving machines by a motor company in Indiana; two 7 x 32-in. bench lathes by a New Jersey electrical manufacturer; three used vertical drilling machines and an automatic centering machine by an ignition manufacturer; four Sigourney bench drills by a company at New Haven, Conn.; a 36-in. x 18-ft. lathe by the Cleveland, Cincinnati, Chicago & St. Louis Railroad; a 12-ft. heavy-duty boring mill by a Milwaukee company; a Cincinnati drill by a New York company; a used boring and drilling machine by a company at Fort Wayne, Ind.; two tool grinders by an Ohio foundry and machine company; a jig boring machine by a cash register company; a 6-in. vertical shaper by a Buffalo company; a Sigourney bench drill by an Ohio match company; a 7 x 32-in. bench drill by a Bristol, Conn., manufacturer; a jig boring machine by a New England machine tool manufacturer; a jig boring machine by a steam turbine company.

The Wood Hydraulic Hoist & Body Co., 721 East 135th Street, New York, manufacturer of motor truck bodies, hoists, etc., has filed plans for a one-story plant, 46 x 100 ft., at Long Island City, for general manufacture and repair division, to cost $81,000 with equipment. Headquarters are at 7924 Riopelle Street, Detroit.

The superintendent of Lighthouses, Staten Island, N. Y., will receive bids until Dec. 13 for 15,000 lb. bronze castings for six months' period beginning Jan. 1, proposal 25639; until Dec. 12 for 20,000 lb. iron castings, same period, proposal 25638; until Dec. 15 for 12,000 cu. ft. acetylene gas for welding service, proposal 25677, and until Dec. 15 for 30,000 cu. ft. oxygen, proposal 25671.

Fire, Nov. 20, damaged a portion of the plant of the Variety Tool & Metal Stamping Co., 217-19 Centre Street, New York.

Gander, Gander & Gander, 17 Steuben Street, Albany, N. Y., architects, have plans for a new three-story automobile service, repair and garage building, to cost more than $110,000 with equipment.

The Texas Natural Resources Corporation, New York, care of Walter Clifford, 565 Fifth Avenue, president, recently organized by Mr. Clifford and associates, has acquired more than 5000 acres in Panola County, vicinity of Marshall, Tex., as a site for a plant to manufacture lignite by-products, including coke specialties, etc., to cost in excess of $300,000 with equipment. The company is capitalized at $1,000,000. It is understood that John A. Kienle, vice-president of the Mathieson Alkali Works, 250 Park Avenue, New York, is interested in the organization.

The Nassau & Suffolk Lighting Co., Hempstead, L. I., has awarded contract to the Semet-Solvay Engineering Corporation, 40 Rector Street, New York, for a single, elevated type steel compartment gas purifier on local site, to be equipped with a hand-operated gantry crane, and elevator and screw conveyor for handling oxide.

The United Electric Light & Power Co., 130 East Fifteenth Street, New York, has plans for extensions in its Hell Gate power house to increase the capacity about 320,000 kw., to cost close to $15,000,000 with machinery. T. E. Murray, Inc., 55 Duane Street, is engineer.

Edward P. Doyle, 11 John Street, New York, architect, has plans for a four-story automobile service, repair and garage building at Flushing, L. I., to cost about $100,000 with equipment.

The General Bronze Corporation, Long Island City, recently formed to consolidate the John Polachek Bronze & Iron Co., 480 Hancock Street, and Renaissance Bronze & Iron Works, foot of Foster Avenue, both Long Island City, is disposing of a preferred stock issue to total $1,500,000, a portion of the fund to be used for expansion.

The Beacon Oil Co., 49 Wall Street, New York, is arranging an increase in capital from 1,000,000 to 1,500,000 shares of common stock, a portion of the proceeds to be used for expansion and betterments.

The New York Edison Co., Irving Place and Fifteenth Street, New York, is having plans drawn for enlargements in its Waterside power station, to cost in excess of $2,000,000 with equipment. T. E. Murray, Inc., 55 Duane Street, is engineer. Bids will soon be asked for a new power substation on Sixth Street, to cost close to $250,000 with machinery. William Whitehill, 709 Sixth Avenue, architect.

The Board of Education, City Hall, Newark, R. D. Argue, secretary, is asking bids until Dec. 14 for metal-working machinery, wood-working machinery, blue print machine, iron and steel, hardware, electrical supplies, pumps and other mechanical equipment for public schools.

The Capitol Chair Co., Newark, has leased a portion of former plant of Heller Brothers, manufacturers of files, etc., totaling about 15,000 sq. ft., and will equip for a new plant.

The Liberty Brass Foundry, 24 Thomas Street, Bloomfield, N. J., has plans for a one-story foundry addition, 35 x 85 ft., to cost approximately $17,000 with equipment. F. L. Pierson, 160 Bloomfield Avenue, architect.

Robert G. Harry, Inc., 245 Bush Street, Brooklyn, manufacturer of bolts, nuts, etc., has leased about two acres of land at Bayonne, N. J., improved with one-story factory, 30 x 200 ft., and adjoining office, and will occupy for new plant. It is understood that Brooklyn works will be removed to the new location and additional equipment installed.

The Model Garage, Inc., 208 Clinton Street, Hoboken, N. J., is planning a two-story addition to cost $130,000 with equipment.

The Dry Ice Corporation of America, Inc., 50 East Forty-second Street, New York, has purchased property, 196 x 600 ft., at Elizabeth, N. J., and contemplates early erection of a two-story plant, to cost in excess of $50,000 with equipment.

The Gilby Wire Co., 123 Jackson Street, Newark, manufacturer of resistance wires, flat wires and fine wires, will move this month to its new plant on Riverside Avenue, consisting of two factory buildings and a foundry. An electric furnace and two crucible furnaces have been installed for the production of nickel-chromium castings. Wilbur B. Driver is president of the company.

The W. B. Connor Co., Inc., 369 Lexington Avenue, New York, maker of steam traps, air filters and Dubus pumps for viscous liquids, has acquired all rights, patents and interests in the Shortt pumping trap from the Stebbins Engineering & Mfg. Co., and is prepared to furnish this trap in various capacities.

E. E. Steiner & Co., 197 East Kinney Street, Newark, manufacturers of japanning, enameling and heat treatment ovens, drying boxes and dip-tanks, are seeking engineering sales representation in the following centers: New York, Philadelphia, Boston, Cleveland, Dayton, Buffalo, Cincinnati, Detroit, Pittsburgh and Chicago.

Philadelphia

PHILADELPHIA, Dec. 5.

PLANS have been filed by the Heintz Mfg. Co., front and Olney Streets, Philadelphia, manufacturer of steel automobile bodies, for an addition on Chew Street.

Officials of the Pennsylvania Salt Co., Widener Building, Philadelphia, have organized the Tacoma Electrochemical Co., a subsidiary with capital of $1,000,000. Waterfront property has been acquired at Tacoma, Wash., for a new plant to manufacture caustic soda, liquid chlorine and kindred products, to cost more than $400,000 with machinery. Initial unit to be ready for operation in the spring.

The Department of City Transit, 1211 Chestnut Street, Philadelphia, has plans for a one-story and basement equipment storage and distributing plant, with repair facilities, 82 x 140 ft., to cost in excess of $60,000.

J. Ethan Fieldstein, Otis Building, Philadelphia, architect, will soon begin erection of a one-story automobile service, repair and garage building on Rochelle Street, 103 x 215 ft., with wing extension, 115 x 235 ft., to cost in excess of $100,000 with equipment.

The Philadelphia Gas Co., Philadelphia, affiliated with the United Gas Improvement Co., Broad and Arch Streets, recently organized, is reported planning the construction of a new local gas generating plant, with capacity of 18,000,000 cu. ft. daily, to include by-product coke department and auxiliary divisions, to cost more than $1,500,000 with equipment.

August Wright, Lansdowne, Pa., will build a one-story machine and mechanical shop in connection with a proposed automobile garage and showroom for which plans have been drawn by Henry L. Reinhold, Jr., 1632 Walnut Street, Philadelphia, architect.

The Thomas Maddock's Sons Co., Trenton, N. J., manufacturer of sanitary ware, with plant in Hamilton Township, is completing a merger with the Abingdon Sanitary Mfg. Co., Abingdon, Ill., and the Eljer Co., Ford City, Pa., and Cameron, W. Va., manufacturer of kindred products, the combined assets to approximate $10,000,000. Expansion is reported under consideration at the Abingdon units.

The Young Steel Products Co., Inc., Philadelphia, has leased space in the building at 48 North Front Street for a factory branch and distributing plant.

The American Acme Corporation, York, Pa., has been formed to take over the American Toy & Novelty Co., with local plant, and the Acme Wagon Co., Emigsville, Pa., manufacturer of automobile bodies, wagons, sleds, etc. The new corporation will have assets in excess of $400,000 and will carry out an expansion program.

The Susquehanna Collieries Co., Nanticoke, Pa., will rebuild the tipple at its local No. 7 breaker, partially destroyed by fire Nov. 25, with loss reported at $60,000 including equipment. Headquarters in the Commercial Trust Building, Philadelphia.

The Norristown Magnesia & Asbestos Co., Washington Street East, Norristown, Pa., manufacturer of steam and water pipe covering, etc., is considering a one-story addition to cost close to $100,000 with equipment.

T. P. Wenner, secretary, school district, 31 South Penn Street, Allentown, Pa., is asking bids until Dec. 19 for one electrically operated ash hoist for the Stevens Building, with iron door, etc.

A bondholders' committee, headed by John H. Mason, Bank of North America & Trust Co., Philadelphia; Chauncey P. Colwell and Arthur Peck, is completing arrangements for a reorganization of the Milton Mfg. Co., Milton, Pa., manufacturer of electric steel castings, nuts, washers, etc., in receivership for more than a year.

The Pennsylvania Power Co., Greenville, Pa., has plans for a two-story equipment storage and distributing plant, 70 x 96 ft., to cost $45,000 with equipment.

The Lehigh Portland Cement Co., Allentown, Pa., is planning a preferred stock issue of $13,000,000, a portion of the fund to be used for expansion and improvements.

The Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, is said to be arranging an expansion and improvement program in 1928 to cost about $5,000,000, including additions and improvements in car and repair shops, track extensions, car barns and other facilities.

The Champion DeArment Tool Co., Meadville, Pa., which has been operated as a partnership, effective Jan. 21, 1928, will be reorganized as a corporation and will continue the manufacture of nail hammers, ball pien hammers, farriers' tools, blacksmiths' anvil tools, tongs, Stillson wrenches and other hand tools. No additional plant space or equipment is contemplated.

New England

BOSTON, Dec. 5.

NOVEMBER was one of the leanest months this year with many New England machine tool dealers. Sales in the closing days were practically at a standstill and so far in December there is nothing that suggests a revival in bookings during the remainder of the year. The most important sales made by local houses the past week included a new jig boring machine to a Massachusetts shop, another to a Vermont shop, a new high-speed Buffalo drill and miscellaneous small used tools. A slight improvement is noted in inquiries for one and two machines, for replacements, but the majority is for 1928 budgets. Two or three Massachusetts shops are in the market for used multi-spindle drills, mostly sixes with more or less special tapping equipment, for delivery this year.

Machine tool dealers take a rather hopeful view of the early 1928 outlook. It is believed a Vermont shop and a New Hampshire plant will each purchase a number of tools. Boston will have a big school job, a local automobile company will require several pieces of equipment, as well as some of the largest New England electrical, machinery and specialty plants. The city of Hartford, Conn., has a large trade school project coming along that will need many machine tools and there are many manufacturing companies that still have in mind the purchase of one or two tools.

In the closing days of November small tool sales picked up, but business for the month was below that of October as well as below November, 1926.

The Vermont industrial situation is righting itself, although slowly. The National Acme Co., Windsor, Fellows Gear Shaper Co., Springfield, and F. R. Patch Mfg. Co., Rutland, lathes, planers and grinders for stone work are, perhaps, the busiest of Vermont plants. All these companies are well supplied with bookings. Conditions in the machine tool making industry in other parts of New England are spotty, but on the whole a shade more active than a month ago.

The Condit Electrical Mfg. Co., 1376 Hyde Park Avenue, Boston, will make some plant additions.

The Lynn Gas & Electric Co., 90 Exchange Street, Lynn, Mass., has started work on a one-story, 65 x 90 ft., boiler house. Stone & Webster, Inc., Boston, is the engineer.

The New England Power Co., 36 Harvard Street, Worcester, is having plans prepared for a power house and other improvements at Bellows Falls, Vt. Plans are private.

The Central Maine Power Co., Water Street, Augusta, Me., has started work on a one-story hydroelectric generating station at Lewiston, Me.

Mechanical Devices, Inc., will take out a Massachusetts charter to manufacture a self-locking nut, automatic cotter pin, screws and other items. It will have an authorized capital of $1,000,000 and will lease the Victory Plant, Squantum, Quincy, Mass., which during the World War was operated by the Bethlehem Shipbuilding Corporation, Ltd., Watson Hartley, Manchester and Liverpool, England, will be president.

The Crane Market

WHILE there has been but little new inquiry in the past week for either overhead or locomotive cranes, there is a fair number of pending inquiries, many of which are expected to close before the end of the year. In the overhead field there are the 13 cranes for the General Electric Co. plant at West Philadelphia, Pa., and the two cranes for the Franklin Lumber Co., Newark, N. J. The inquiry of the Phoenix Utility Co., 71 Broadway, New York, for a 150-ton overhead crane with two 75-ton trolleys has been issued and is expected to close shortly. Among locomotive crane inquiries is a 40-ton locomotive crane for the Bethlehem Mines Corporation, Bethlehem, Pa., to be used at the Cornwall ore mines.

Among recent purchases are:

Standard Oil Co. of New Jersey, 26 Broadway, New York, a 5-ton, single I-beam hand power crane from the New Jersey Foundry & Machine Co.

Western Electric Co., Chicago, monorail track and trolleys for wire and rod mill, from the Shaw Electric Crane Co.

International Steel & Iron Co., Evansville, Ind., a 20-ton, double trolley electric crane from an unnamed builder.

City of Hamilton, Ohio, a 25-ton, 1-motor, overhead crane from the Niles Crane Corporation.

W. A. Baehr, Chicago, a 12½-ton crawl-tread locomotive crane for Waukegan, Ill., from the McMyler Interstate Co.

North Pier Terminal Co., South Chicago, four gantry and locomotive cranes from the McMyler Interstate Co.

National Tube Co., Pittsburgh, a 25-ton trolley with 7½-ton auxiliary for Lorain, Ohio, from the Alliance Machine Co.

Union Electric Steel Corporation, Carnegie, Pa., a 4-ton, 30-ft. span overhead crane from the Northern Engineering Works.

The Morgan Engineering Co., Alliance, Ohio, reports a record month's business in October with orders booked for a total of 16 overhead cranes. In addition to the small cranes, a 175-ton ladle crane, three 50-ton standard and one soaking pit crane were closed with the American Rolling Mill Co. for its Middletown plant, a 200-ton locomotive handling crane was booked from the Canadian National Railways and a 250-ton, special 3-girder crane for the Bethlehem Steel Corporation's Lackawanna plant.

Orders that developed later in the month included two 75-ton, 120-ft. span overhead cranes for plants of the McClintic-Marshall Co. at Pottstown and Rankin, Pa., a 125-ton ladle crane, a soaking pit crane and a low type open-hearth floor charging machine for the Continental Steel Co., Kokomo, Ind., a 100-ton ladle crane and 75-ton standard crane for the Youngstown Sheet & Tube Co. and a 150-ton and 100-ton ladle crane for an unnamed user.

The total estimated weight of these sixteen cranes was 5,576,000 lb., or an average of 174.5 tons each. Deducting the three special machines, the combined rated lifting capacity of the 13 standard cranes was 1785 tons.

The Foster Grant Co., 28 Manning Avenue, Leominster, Mass., novelties, contemplates a plant addition. Details will be given out later.

The American Bosch Magneto Corporation, Springfield, Mass., which has a large contract for ignition sets for the Ford Motor Co., expects to go on a quantity production basis this month.

The L. & H. Aircraft Corporation, 98 High Street, Hartford, Conn., has been organized to distribute airplanes and parts. Contract has been let for the erection of a hangar in Hartford.

The Whiting Paper Co., Holyoke, Mass., has purchased the local textile plant of the Lyman Mills, Inc., and will remodel for a new plant for high grade writing and bond papers. Entire project will cost more than $1,500,000, including property acquisition.

The Gilbert & Bennett Co., Georgetown, Conn., manufacturer of wire cloth, netting, etc., has awarded general contract to the Hewlitt Co., Bridgeport, Conn., for two one-story additions, 35 x 45 ft., and 40 x 40 ft. Greenwood & Noerr, Hartford, Conn., architects.

Winslow & Co., Inc., Forest Avenue, Portland, Me., manufacturer of fire brick, etc., has engaged Webster & Libby, 11 Exchange Street, architects, to prepare plans for rebuilding the portion of its plant recently destroyed by fire, with loss in excess of $150,000 with equipment.

The Connecticut Light & Power Co., Waterbury, Conn., has authorized the sale of $6,500,000 of preferred stock, a portion of the fund to be used for expansion and betterments, including transmission line construction. Work is under way on a new hydroelectric power development at New Milford, Conn., for capacity of 32,000 hp., to be ready for service next summer. J. Henry Roraback is president.

The Bernard L. McDonald Co., 398 Essex Street, Lawrence, Mass., has plans for a one-story ice-manufacturing plant to cost in excess of $40,000 with equipment. Funk & Wilcox Co., 26 Pemberton Square, Boston, architects.

The Atlas Plywood Corporation, 31 St. James Avenue, Boston, has purchased the Otis Allen & Son Co., Lawrence and Lowell, Mass., and will continue as a subsidiary. E. I. MacPhie, heretofore president of the acquired company will become general manager of the Atlas organization.

The Skinner Organ Co., Sydney Street, Dorchester, Boston, has plans for a new three-story factory to cost about $50,000 with equipment.

Ovens, power equipment, conveying machinery, etc., will be installed in the one and two-story plant, 100 x 170 ft., to be built by the Raymond Baking Co., 490 South Main Street, Waterbury, Conn., to cost close to $100,000.

The American Fastener Co., Maple Avenue, Waterbury, Conn., has awarded general contract to the Complete Construction Co., 102 Fairview Street, for a four-story addition, 40 x 105 ft., to cost close to $100,000 with equipment. C. Jerome Bailey, Waterbury, architect.

Chicago

CHICAGO, Dec. 5.

MACHINE tool dealers find orders less common and inquiries more difficult to close. Fresh inquiry is dragging and for the most part sales effort is being directed to scattered requirements of miscellaneous buyers. The announcement that a dealer has 800 machine tools for sale from the plant of the Marmon Motor Car Co., Indianapolis, has been disconcerting to the local trade and since this list has been made public a number of prospective buyers have indicated keen interest in it. Movement of used machine tools is in fair volume, but sales are made at unusually low prices and in some cases from stocks that are being reduced or liquidated.

As a whole, November bookings have fallen a trifle below October, but the average is above those in any of the summer months. The Nelson LeMoon Motor Truck Co., Chicago, has purchased two lathes, a shaper and several miscellaneous items. A printing press manufacturer will buy a large radial drill and several makers of Ford parts, noticeably forge shops, are expected to come into the market for tool room equipment.

Recent advances of about 10 per cent in certain lines of grinders, shapers and milling machines are soon to become effective, the trade having been given about 30 days to take business at the old schedule.

The Robert Linn Foundry & Machine Works, Chicago, has purchased for $42,000 the Crawford & McCrimmon Co., Brazil, Ind., from David W. Wood, receiver.

Scully, Jones & Co., 2012 West Thirteenth Street, Chicago, manufacturers and jobbers of foundry equipment, have purchased from Joseph A. Golde the holding formerly occupied by the Pridmore Co. on the corner of West Nineteenth and Rockwell Streets.

Manning, Maxwell & Moore, Inc., 27 North Jefferson Street, Chicago, has been appointed exclusive sales representative in the Chicago and St. Louis districts for hydraulic machinery, valves and fittings manufactured by R. D. Wood & Co., Philadelphia.

The Fischer & Hayes Rope & Steel Co., 816 West Erie Street, Chicago, manufacturer of wire rope, etc., has acquired for expansion property, 136 x 160 ft., at Erie Avenue and Green Street, improved with three-story and basement building.

The Fisher Governor Co., First Avenue and Lynn Street, Marshalltown, Iowa, manufacturer of engine governors, etc., plans early call for bids on general contract for a one-story addition, to cost about $40,000 with equipment. Harry Reimer, Kibby Building, is architect.

The Great Northern Railway Co., St. Paul, Minn., is said to have plans for a one-story addition to its shops at St. Cloud, Minn., to be equipped primarily as a scrap iron reclamation unit, to cost approximately $50,000 with machinery.

The City Council, City Hall, Alexandria, Minn., is asking bids on general contract until Dec. 14 for extensions and improvements in the municipal electric light and power plant, with installation of additional equipment. It will cost approximately $70,000. The Pillsbury Engineering Co., 2344 Nicollet Avenue, Minneapolis, Minn., is engineer.

The Dewey Portland Cement Co., Davenport, Iowa, is considering extensions and improvements in its mill at Buffalo, near Davenport, with installation of additional equipment to increase the output from 3000 to 5000 bbl. per day, to cost more than $600,000. A new kiln will be installed. Headquarters are in the Mutual Building, Kansas City, Mo. Herbert F. Tyler, manager at Davenport.

The Donlin-Johnson Co., St. Cloud, Minn., manufacturer of sash, doors and other millwork products, will build a new one-story plant, 60 x 140 ft., with two one-story structures adjoining, 40 x 122 ft., and 20 x 140 ft. Entire project to cost close to $75,000 with equipment.

The Carney Co., Mankato, Minn., has engaged George Pass & Son, Eckle Building, architects, to prepare plans for rebuilding its cement mill partially destroyed by fire, with loss at close to $125,000 with equipment.

The Rockwell-Barnes Co., 833 South Wabash Avenue, Chicago, manufacturer of paper products, has awarded general contract to the Chicago Industrial Construction Co., 53 West Jackson Boulevard, for a two-story addition, to cost about $50,000. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Pellar Brothers, Inc., 3659 West Harrison Street, Chicago, baker, plans a new three-story and basement plant, 50 x 125 ft., with ovens, power equipment, conveying machinery, etc. The entire project will cost about $150,000.

The C. G. Spring Co. of Illinois, Inc., 1455 West Thirty-eighth Street, Chicago, manufacturer of automobile bumpers, springs, etc., has awarded general contract to the Fred J. Carstens Co., 646 North Michigan Boulevard, for a one-story addition and improvements in present plant, to cost $35,000. The company is a subsidiary of the C. G. Spring & Bumper Co., 2646 East Grand Boulevard, Detroit.

The Bismarck Implement Co., 201 Main Street, Bismarck, N. D., has plans for a four-story storage and distributing plant to cost approximately $30,000.

The Hudson Metal Products Co., 120 North Green Street, Chicago, mentioned in the issue of Nov. 24 as about to build a one-story manufacturing plant, is operated by E. J. Hudson and not by J. C. Spengler & Sons, as our item stated. The latter firm is erecting the plant for the owner.

The Hyman-Michaels Co., Chicago, has been appointed sales agent in the Mid-West territory for the Ohio Locomotive Crane Co., Bucyrus, Ohio, and its subsidiary, the Toledo Crane Co., Toledo, Ohio. These companies manufacture locomotive, overhead, traveling and gantry cranes, operated by steam, electricity or gasoline.

Buffalo

BUFFALO, Dec. 5.

BIDS will be received by the Quartermaster Department, Purchasing and Contracting Officer, Fort Niagara, N. Y., until Dec. 22 for two centrifugal pumps, circular 72.

The Oswego Board Corporation, Oswego, N. Y., recently formed as a subsidiary of the St. Regis Paper Co., Watertown, N. Y., is completing plans for a new mill at Oswego for the production of insulating board products, to cost in excess of $1,500,000 with machinery. Parent company disposed of a preferred stock issue a few weeks ago totaling $2,739,900, a portion of the fund to be used for expansion.

The Continental Can Co., Syracuse, N. Y., contemplates the construction of a four-story plant, 140 x 160 ft., adjoining the proposed factory of the Campbell Soup Co., on West Thirty-fifth Street, Chicago, to be used exclusively for production of tin cans and containers for the last-noted company. It will be connected with the Campbell unit by mechanical conveyors and is reported to cost more than $500,000 with machinery. Headquarters, 30 East Forty-second Street, New York.

The Board of City Trustees, Seneca Falls, N. Y., is said to be planning the installation of pumping equipment and power machinery in connection with extensions and improvements in municipal waterworks, to cost $450,000.

The Board of Education, Kenmore, N. Y., plans early call for bids for a three-story high school addition on the Delaware Road, with manual training department, to cost $725,000. J. F. and W. A. Kidd, 524 Franklin Street, Buffalo, are architects; Harry P. Dempsey, Delaware Court Building, Buffalo, mechanical engineer.

The O. M. Edwards Co., Syracuse, N. Y., manufacturer of railroad supplies, steel office furniture and bank equipment, has enlarged its plant by the erection of a four-story and basement addition 50 x 160 ft. and a single-story saw tooth extension 120 x 120 ft., the latter being provided for the present equipment. The extensions were built by the H. K. Ferguson Co., Cleveland.

Cincinnati

CINCINNATI, Dec. 5.

DECISION of machine tool manufacturers to advance prices is the outstanding feature of the market. This step is being taken largely because of the increased service which buyers are demanding. While this policy has not been adopted by builders of all kinds of machines, indications are that prices of all machine tool companies will be on a higher level within a short time.

Business the past week has been of moderate volume. Manufacturers are of the opinion that sales in 1928 will about parallel those of 1927, which is regarded as a normal year. There are a few executives, however, who believe that bookings next year will show an improvement over this year. A Middletown, Ohio, company has bought five engine lathes and a planer, and the Michigan Central has closed for two engine lathes. The Big Four is inquiring for a 36-in. lathe. The Norfolk & Western is reported ready to make purchases against its list of 104 tools. The bulk of orders received recently by local companies has been from small metal-working plants, automobile makers and railroads having contributed little to the total sum.

The R. H. P. Motor Co., 5019 Whetsel Avenue, Cincinnati, has awarded general contract to Charles T. Rose, Oakley Bank Building, for a one-story repair shop, to cost about $25,000 with equipment. Jess Wilson, Cincinnati, is architect.

The Air Corps, Material Divisions, Wright Field, Dayton, Ohio, will receive bids until Dec. 19 for one engine lathe, and one disk and spindle sander, circular 160; until Dec. 14 for airplane parts, including 350 magazine assemblies, 150 adjusting wrenches, 1000 springs, 60 winding handles, 35 mount assemblies, etc.; until Dec. 12 for eight motor-generator units with flexible couplings, circular 163; and until Dec. 12 for three portable air compressors, circular 159.

The Board of Trustees, Ohio State University, Columbus, plans a call for bids early in the coming year for a one-story power house to cost $150,000 with equipment. W. C. McCracken, Ohio State University, is engineer.

The Grocers' Baking Co., 1455 South Seventh Street, Louisville, plans installation of ovens, conveying and other equipment in a two-story and basement plant, 70 x 200 ft., at Johnson City, Tenn., where building has been acquired. The equipment will cost close to $100,000.

The Cliff Machine Co., Louisa, Ky., has leased property at Owensboro, Ky., for the establishment of a new machine works, largely for repair of engines and other heavy equipment, drilling tools, etc.

The Cincinnati Street Railway Co., Dixie Terminal Building, Cincinnati, has filed plans for a one-story power substation, to cost about $30,000 with equipment.

The Department of Highways and Public Works, Ohio Hartman Building, Columbus, Ohio, has plans for a one-story machine shop and automobile repair works at West Union, Ohio, to cost $50,000 with equipment. H. B. Briggs, Ohio Hartman Building, is engineer.

The Vanitas Co., Inc., East Eighth Street, Chattanooga, Tenn., recently formed with capital of $30,000, will operate a local plant for the manufacture of hosiery needles, etc. George T. Walker, and T. N. Van Dyke, 835 Oak Street, are heads.

The Franklin Gas Co., 110 Washington Street, Franklin, Ky., has plans for extensions and improvements, including about 8 miles of pipe line. Company contemplates the purchase of pressure regulators, meters and kindred equipment.

F. J. Blumberg & Co., 604 Brighton Street, Newport, Ky., scrap iron dealers, have purchased the local plant and real estate of the Newport Foundry Co. The building will be remodeled to conform to expansion plans of the company.

South Atlantic States

BALTIMORE, Dec. 5.

THE Maryland Dry Dock Co., Curtis Bay, Baltimore, will make extensions and improvements in plant to cost more than $500,000, including installation of 9000-ton drydock, additional repair facilities, construction of new pier, with mechanical handling apparatus, etc.

The Wilson-Nash Co., Remington Avenue and Twenty-ninth Street, Baltimore, will have revised plans prepared for a one-story service, repair and garage building addition, to cost close to $100,000 with equipment. Owens & Sisco, Continental Building, are architects.

Charles W. Priddy & Co., Inc., Flat Iron Building, Norfolk, Va., will make extensions in plant at Money Point, including removal of plaster mill from Portsmouth, Va., to that location, with equipment for grinding of gypsum rock, etc. Expansion will cost close to $50,000 including machinery.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Dec. 13 for portable electric drills and grinders for Eastern and Western yards, schedule 8139.

The Cumberland Box Co., Cumberland, Md., will rebuild the portion of its box and crate mill recently destroyed by fire, with loss of more than $40,000 with equipment. Box-making machinery will be purchased.

The Board of Education, Raleigh, N. C., contemplates the installation of manual training equipment in a new high school in the Smallwood district to cost $500,000.

E. J. Rosenstein, Equitable Building, Baltimore, and associates are having plans drawn for a two-story automobile service, repair and garage building to cost in excess of $200,000 with equipment.

The United States Talc & Crayon Co., Siler Road, Glendon, N. C., is considering rebuilding the portion of its plant destroyed by fire Nov. 28, with loss close to $50,000 with equipment.

The Alexandria Water Co., Alexandria, Va., is asking bids until Dec. 12 for equipment for extensions in pumping plant, including steam boiler, heaters, power-driven water pump, steam-turbine driven pumping unit, feed-water pump, crane and appurtenances. Hazen & Whipple, 25 East Forty-third Street, New York, are consulting engineers.

The Graybar Electric Co., 100 East Forty-second Street, New York, contemplates establishment of a new factory branch and distributing plant at Roanoke, Va., to cost close to $30,000.

The Godfrey Marble & Tile Co., Ashby Street, Atlanta, Ga., H. M. Godfrey, head, has leased a tract of limestone deposits in Randolph County, Ga., and plans early development. A railroad line will be built. Finishing operations will be carried out at the Atlanta works.

The Prevette-Wilson Mfg. Co., Statesville, N. C., recently formed with a capital of $125,000 by J. R. Prevette and H. A. Wilson, both of Statesville, contemplates the operation of a local plant for the production of illuminated automobile signs.

The Carolina Power & Light Co., Raleigh, N. C., has concluded the purchase of the electric light and power plant at Zebulon, N. C., and plans extensions and improvements, including transmission line construction.

The Layne-Atlantic Co., Seaboard Railway Building, Norfolk, Va., an interest of the Layne & Bowler Mfg. Co., same address, has contracted for the installation of a water system at Parkersburg, W. Va., and will purchase equipment, including ditching machine, iron removal equipment, reinforcing bars, electric power equipment, pipe, etc.

The Central Oil Co., Inc., Norton, Va., has plans for a one-story oil storage and distributing plant, with capacity of about 25,000 gal.; pumping equipment will be installed.

Pittsburgh

PITTSBURGH, Dec. 5.

ACTUAL purchases of machine tools are few and small, the general tendency of buyers being to put into next year's budget all requirements that are not pressing. There is a cheerful tone in the trade, however, as inquiries are much more numerous and if there is the upturn in activities of the steel and metal-working industries that is expected, it is believed machine tool sales will benefit. Inquiries for cranes and other heavy machinery are reported to be more frequent and also for electrical equipment.

The Dravo Contracting Co., 302 Penn Avenue, Pittsburgh, operating a shipyard in the Neville Island district, has concluded arrangements for purchase of a tract of 6½ acres at Wilmington, Del., with frontage of 875 ft. on the Christiana River, as a site for a new shipbuilding works, to be devoted primarily to steel barges and kindred floating equipment, with repair department. It is reported to cost in excess of $400,000 with machinery. The new plant will be operated in conjunction with a steel barge assembling yard at Gloucester, N. J.

The Selden Co., 339 Second Avenue, Pittsburgh, manufacturer of industrial chemicals, etc., has awarded contract to the Taylor-Meyer Co., Keystone Building, for a one-story addition and improvements in present plant, to cost $45,000.

The city controller, City-County Building, Pittsburgh, will receive bids until Dec. 15 for coal-handling equipment for the Ross pumping station. Plans and specifications at the Bureau of Engineering, room 440, City-County Building Edward G. Lang, director Department of Public Works.

The Witherow Steel Co., Neville Island, Pittsburgh, has awarded a general contract to Hughes-Foulkrod Co., 421 Seventh Avenue, for a one-story addition, 50 x 235 ft., to be equipped as a machine shop, to cost $50,000.

The United States Engineer, Huntington, W. Va., is asking bids until Dec. 16 for one marine gasoline engine, circular 109.

The Industrial Land & Building Co., Wheeling, W. Va., has engaged C. W. Bates, Wheeling, architect, to prepare plans for a plant at Glendale, totaling about three acres of floor space, to be occupied under lease by the Fokker Aircraft Corporation, 110 East Forty-second Street, New York, for aeroplane manufacture. Entire project will cost in excess of $400,000 with machinery.

The Northwood Glass Co., Wheeling, W. Va., has been acquired by new interests, affiliated with the J. R. Greenlee Co., Bellaire, Ohio, which will take immediate possession. Plans are under way for extensions and betterments, including installation of equipment for manufacture of lighting fixtures, etc.

Detroit

DETROIT, Dec. 5.

CONTRACT has been let by the Linde Air Products Co., 30 East Forty-second Street, New York, to the Owen-Ames-Kimball Co., Grand Rapids, Mich., for a one-story plant at Grand Rapids, to cost upward of $60,000 with equipment.

The Union School District, Pontiac, Mich., is arranging a fund of $370,000 for an addition to the high school, including an industrial arts building and steam power plant. Joseph H. Harris is superintendent of schools.

The National Porcelain Enameling & Foundry Co., Detroit, Frank G. Cordner, 415 Brainard Street, architect, in charge, has awarded a general contract to the Cooper-Little Co., Maccabees Building, for the first unit of its plant on the Plymouth Road, one story, 56 x 160 ft., to cost about $65,000. Other units will be built later.

The Standard Plating & Novelty Works, Battle Creek, Mich., lately organized, has taken over the Queen City Plating & Novelty Works, with local plant. A portion of the local factory of the Cole Mfg. Co. has been secured under lease and will be occupied by the new company to double present capacity. C. A. Crippen, Battle Creek, and Edward Holden, Kalamazoo, Mich., head the new organization.

The Michigan Fertilizer Co., Lansing, Mich., recently formed by W. B. Merry, Lansing, and associates, has acquired property on Highmont Street and contemplates the erection of a new plant to cost upward of $100,000 including machinery. W. J. Sprow is also interested in the company.

The Chevrolet Motor Co., Flint, Mich., has concluded arrangements for the purchase of the gray iron foundry of the Saginaw Products Co., Saginaw, Mich., and will operate in the future for production of castings for Chevrolet cars. The plant has facilities for handling 800 tons of metal daily.

The Michigan Hardwood Products Co., Boyne City, Mich., recently organized, is completing plans for the establishment of a local mill for the production of hardwood flooring. All machinery will be electrically operated. The initial unit will cost more than $40,000. W. H. White, Boyne City, and Charles E. McGinnis, Sault Ste. Marie, Mich., are heads.

The Standard Oil Co. of Indiana, 910 South Michigan Avenue, Chicago, has work under way on a new refinery at Saginaw, Mich., to cost upward of $200,000.

The Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., is disposing of a capital stock issue to total about $1,900,000, a portion of the fund to be used for expansion.

The R. C. Mahon Co., Detroit, is enlarging its plant by 100,000 sq. ft. of additional floor space and is in the market for cranes, multiple drills, milling machines, punches, straight and angle shears, and straightening tables.

The Wilmarth & Morman Co., Grand Rapids, Mich., manufacturer of machine tools and grinding machinery, has removed its executive offices to Big Rapids, Mich., as the result of its consolidation with the Machinery Co. of America. The Wilmarth & Morman factory has been moved to the Covel branch at Benton Harbor, Mich., and prices and freight rates on machines and repair parts hereafter

The Wolverine Bumper & Specialty Co., Grand Rapids, will be f.o.b. Benton Harbor.
Mich., will build a factory addition, 23 x 82 ft., to cost $7,200.

Milwaukee

MILWAUKEE, Dec. 5.

THE call for machine tools shows some signs of betterment, although the volume of sales is just about holding its own at present. There has been an improvement in inquiry, but in the main this contemplates acquisition of new equipment in the fore part of the new year rather than immediately. Sentiment in the trade looks for greater manufacturing activity, but it is not believed the large extension of production calling for volume buying is yet in sight.

The Hamilton Metalplane Co., 60 Keefe Avenue, Milwaukee, organized recently by leading manufacturers for the production of all-metal aircraft, has leased a building at 530 Park Street and is buying miscellaneous machinery. Parts for the initial quota of 25 ships are being put into production and the first group of five is to be ready for delivery about March 1. Thomas F. Hamilton is president, and Clarence R. Falk, vice-president.

The Wisconsin Ice & Coal Co., 320 East North Avenue, Milwaukee, has placed contract with the Vilter Mfg. Co., local, for refrigerating machinery for a new artificial ice production plant, 110 x 150 ft., estimated to cost $150,000. Ground was broken Dec. 1. The company is taking bids on the hopper and transfer equipment of a new coal yard with a length of 675 ft. J. J. O'Connor is vice-president and general manager.

The Waltham Piano Co., 1623 Island Avenue, Milwaukee, has plans for a $100,000 addition to its factory for the production of combination electric pianos and radio receiving sets. The building will be 80 x 250 ft., four stories. Construction will begin about Jan. 1. Paul F. Netzow is president and general manager.

The Prime Mfg. Co., 653 Clinton Street, Milwaukee, manufacturer of railroad and automotive parts and specialties, brass and bronze castings, etc., has started work on an additional story, 60 x 110 ft., to one of its present buildings. With equipment the improvement will cost about $30,000.

The Carbon Engineering Co., 1700 Eighth Avenue, Milwaukee, manufacturer of carbon and metal products used in electric motors and generators, contemplates the immediate purchase of the property of the Vim Tractor Co., at Slinger, near Milwaukee. The plant has been idle for several years and will require much reequipment. The Carbon company will increase its capital stock from $100,000 to $150,000 or $200,000 if purchase negotiations are successful. John Hurum is secretary and treasurer.

The Supreme Tool & Die Co., Milwaukee, has been incorporated with $25,000 capital stock and is preparing to establish a general machine shop specializing in the production of tools, dies, fixtures, jigs, etc. Charles M. Seefurth, 900 Buffum Street, is associated with Henry and Otto Genrich in the enterprise.

The Gugler Lithographic Co., 694 Broadway, Milwaukee, has started construction work on a building, 60 x 125 ft., two stories and basement, adjoining its present plant. It will cost about $75,000 with machinery.

The Century Fence Co., Waukesha, Wis., which has sold its tube manufacturing facilities to the Mid-West Forging Co., Chicago, is also transferring its fencing operation to Chicago Heights, Ill., and until disposition is made of its factory in Waukesha, will use it as a distributing warehouse. The change is made to effect economies in manufacture.

Gulf States

BIRMINGHAM, Dec. 5.

PLANS have been approved by the Valley Electric & Ice Co., San Antonio, Tex., for a one-story, electrically-operated ice-manufacturing and cold storage plant at McAllen, Tex., to cost $100,000 with equipment.

The Wilson Corporation, 607 North Scott Avenue, Wichita Falls, Tex., recently formed with capital of $50,000, plans the operation of a local factory for the manufacture of oil well equipment.

The United States Engineer, Galveston, Tex., will receive bids until Dec. 23 for one vertical propelling engine of full Diesel type, circular 80.

The Louisiana Power & Light Co., New Orleans, has arranged for a bond issue of $8,000,000, a portion of the fund to be used for extensions and improvements in power plants and system, including transmission line construction.

The Hart Lumber Co., Ponce de Leon, Fla., is considering rebuilding the portion of its lumber and planing mill recently destroyed by fire, with loss estimated at $100,000 including machinery.

The Florida Cold Storage Co., Sanford, Fla., recently formed with a capital of $1,250,000, is contemplating establishment of cold storage and refrigerating plants at Sanford and Orlando, Fla., each to cost about $300,000 with machinery. E. A. Douglass and M. O. Overstreet, 206 East Central Avenue, Orlando, are heads.

The West Texas Utilities Co., Abilene, Tex., is said to be arranging early call for bids for addition to its steam-operated electric generating plant at San Angelo, Tex., to cost more than $400,000 with transmission line. Sargent & Lundy, 72 West Adams Street, Chicago, engineers.

The Phelps-Dodge Corporation, 90 John Street, New York, operating copper properties, is said to be considering a new refinery in the vicinity of El Paso, Tex., where an option has been taken on more than 5000 acres. The initial unit is reported to cost in excess of $1,000,000 with machinery.

The Alabama Power Co., Birmingham, is planning the sale of $40,000,000 in bonds, a portion of the proceeds to be used for extensions and improvements in power plants and system, including new generating station and transmission line construction.

The Central Power & Light Co., Frost Building, San Antonio, Tex., is planning the installation of a power house at Fort Davis, Tex., where franchise for light and power recently was secured. The company will make extensions in power plant at Del Rio, Tex., with installation of two Diesel engines and accessories.

The Sewage and Water Board, 526 Carondelet Street, New Orleans is asking bids until Jan. 23 for pumping machinery, check valves, etc., for the River pumping station. George G. Earl, general superintendent.

The Dixie Ice Co., Taylor, Tex., is contemplating erection of a new ice-manufacturing and cold storage plant, to cost upward of $50,000 with equipment.

The City Council, St. Petersburg, Fla., plans the installation of water-treating and filtration equipment in connection with extensions and betterments in municipal waterworks. A fund of $750,000 is being arranged. R. E. Ludwig, director of public utilities.

The Board of Education, Panhandle, Tex., contemplates the installation of manual training equipment in a two-story high school to cost $160,000, for which bids will be asked on general contract this month. The Butler Co., Wilson Building, Lubbock, Tex., architect.

The Common Council, Monroe, La., is considering extensions and improvements in the municipal electric power plant, with equipment to double present capacity, to cost $135,000.

The Newport Co., West Main Street, Pensacola, Fla., manufacturer of turpentine and other naval stores, has work in progress on an expansion and betterment program, to cost about $400,000 including additional equipment. Plans are being considered for further extensions to the plant for the production of special products, to cost $200,000 in addition to sum noted.

The New Orleans Public Service Co., New Orleans, plans the installation of a natural gas system in different parts of the city, including high pressure pipe lines and expansion in present gas distributing plant and system for mixing natural and artificial gas. Estimated cost in excess of $1,000,000.

The Houston Show Case & Mfg. Co., 3616 Washington Street, Houston, Tex., has filed plans for a new plant to cost about $50,000 with equipment.

The Rubber Co. of America, Inc., Sheffield, Ala., recently organized, has begun work on a one-story plant, 50 x 200 ft., for the manufacture of hard rubber flooring, etc., to cost upward of $45,000 with equipment.

The Galvanizing & Plating Co. of Texas, 3205 Engelke Street, Houston, Tex., has been organized to do a jobbing business in hot dip galvanizing and later to engage in tin plating and cadmium plating. A manufacturing building is practically completed and equipment has been purchased. The company expects to be operating by Jan. 1.

Cleveland

CLEVELAND, Dec. 5.

DEALERS report a slowing down in machine tool sales. While a moderate volume of inquiry is being received, many prospective purchasers indicate that they will not place orders until the new year. A local manufacturer of turret lathes reports more sales so far this month than in the corresponding period for several months past. Manufacturers of automatic screw machines are getting a fair volume of single tool orders. A local steel plant during the week purchased two large turret lathes and a 6-in. pipe threading machine, and a stamping plant, a 20-in. Pratt & Whitney geared head lathe. There is a slight turn for the better in the metal-working industry in Cleveland, which is due, at least in part, to placing of some business by automobile manufacturers with stamping and other parts makers.

The Federal Paper Board Co., River Road, Bogota, N. J., is considering the erection of a one-story mill at Steubenville, Ohio, to cost in excess of $50,000 with equipment. J. L. Mousley is one of the heads of company in charge.

The North American Light & Power Co., Cleveland, operating the Illinois Power & Light Corporation, Missouri Power & Light Co. and other utilities, has arranged for a bond issue of $5,000,000, a portion of the proceeds to be used for expansion and betterments.

The Zanesville Washed Gravel Co., Dresden, Ohio, will rebuild the portion of its plant destroyed by fire Nov. 14, with loss reported at more than $85,000 including equipment.

The Williams Alloy Products Co., Elyria, Ohio, manufacturer of special alloys, has disposed of a common stock issue of $250,000, a portion of the proceeds to be used for expansion.

The Board of Education, Newark, Ohio, plans the installation of manual training equipment in three new junior high schools in east, north and west side districts, to cost $800,000. Vernon Redding and Associates, Walpark Building, Mansfield, Ohio, architects.

The Luntz Iron & Steel Co., Canton, Ohio, has secured the local plant of the Canton Steel Foundry, bankrupt, at a public sale for $120,000, including buildings with 293,000 sq. ft. of floor space on 41-acre tract. It will be used by the new owner for expansion.

The City Ice & Fuel Co., 6611 Euclid Avenue, Cleveland, will soon begin the erection of a six-story and basement cold storage and refrigerating plant 200 x 200 ft., to cost about $650,000 with machinery.

Killen & Wise, 931 East North Street, Lima, Ohio, have revised plans for a three-story automobile service, repair and garage building, to cost close to $100,000 with equipment.

The Mogadore Insulator Co., Akron, Ohio, manufacturer of electric insulators, will proceed with superstructure for a one-story addition, to cost in excess of $45,000 with equipment.

St. Louis

ST. LOUIS, Dec. 5.

FOUNDATIONS will be laid soon by the Gleaner Combine Harvester Corporation, Independence, Mo., manufacturer of harvesting machinery, parts, etc., for a one-story addition, 220 x 500 ft., to cost in excess of $100,000 with equipment.

The Missouri Farmers' Association, Virginia Building, Columbia, Mo., H. A. Cowden, secretary, will build a one-story cold storage and refrigerating plant at Willow Springs, Mo., to cost approximately $40,000 with equipment.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., has work under way on an addition to its steam-operated electric generating plant at Harrah, Okla., reported to cost in excess of $600,000 with equipment.

The United Motor Service, Inc., 2701 Warwick Boulevard, Kansas City, Mo., has plans for a two-story and basement automobile repair and service works, 100 x 125 ft., to cost more than $50,000 with equipment. R. H. Sannerman, Lee Building, is architect.

The Arkansas Power & Light Co., Pine Bluff, Ark., has arranged for a bond issue of $3,000,000, a portion of the proceeds to be used for expansion and betterments, including transmission lines construction.

The Mertz Auto Body & Radiator Co., 235 North Sixth Street, East St. Louis, Ill., is considering plans for a one-story addition, to cost close to $35,000 with equipment.

The McGraw Machine Co., 2124 Y Street, Lincoln, Neb., has filed plans for a two-story plant, 50 x 56 ft., to cost $30,000 with equipment.

The Midwest Milling Co., Abilene, Kan., is considering rebuilding the portion of its plant destroyed by fire Nov. 17, with loss in excess of $130,000 including machinery.

The Standard Brass Mfg. Co., 1300 Chestnut Street, Kansas City, Mo., has awarded a general contract to A. E. King, 2532 Agnes Street, for a one-story foundry, 100 x 130 ft., to cost close to $30,000 with equipment.

The C. J. Patterson Corporation, 4050 Penn Street, Kansas City, Mo., has filed plans for a new baking plant at Tulsa, Okla., to be equipped with ovens, conveying and other machinery to cost about $100,000.

The Springfield Gas & Electric Co., Springfield, Mo., will make extensions and improvements in gas generating plant, with installation of compressors, boosters and accessory equipment.

The Common Council, Marceline, Mo., plans the installation of a water-softening plant and filtration equipment in connection with proposed extensions in the municipal waterworks. Black & Veatch, Mutual Building, Kansas City, Mo., consulting engineers. A fund of $70,000 has been arranged.

The Cities Service Co., 60 Wall Street, New York, operating oil and gas properties, is reported planning the construction of a new pipe line from Leavenworth, Kan., to St. Joseph, Mo., to cost approximately $1,000,000.

The Rogers Foundry & Mfg. Co. and the United Iron Works, both of Joplin, Mo., have consolidated and the Rogers Iron Works Co. has been incorporated to take over the properties. Officers of the new company are C. B. Rogers, president; L. T. LeBow, vice-president and treasurer; Ellis Rogers, vice-president, and R. H. Linn, secretary.

Indiana

INDIANAPOLIS, Dec. 5.

THE Weil-McLain Co., Michigan City, Ind., manufacturer of boilers, radiators, etc., has plans in progress for its new plant at Erie, Pa., consisting of two main units, 120 x 500 ft., and 75 x 300 ft., to cost close to $200,000 with equipment.

H. L. Warriner, 673 Broadway, Gary, Ind., architect, has plans for a one-story automobile service, repair and garage building, to cost close to $100,000 with equipment.

The Board of Works, Elkhart, Ind., plans early call for bids for a new elevated steel water tank with tower, capacity 500,000 gal., to cost close to $50,000.

The Board of Public Works, Oakland, Ind., is said to be planning the installation of pumping equipment and other apparatus in connection with a new sewerage system, to cost close to $100,000 with equipment. Work will begin in the spring.

The Fairfield Mfg. Co., Wallace Avenue and the Belt Line Railway, Lafayette, Ind., manufacturer of gears, cutters, etc., has plans for a one-story addition, 80 x 100 ft., to cost close to $30,000 with equipment.

The Board of Trustees, Purdue University, Lafayette, Ind., has plans under way for a one-story mechanical repair and service building, to cost about $75,000 with equipment. It is purposed to ask bids in January. Walter Scholer, Painters' and Decorators' Building, is architect.

The Melaun Mfg. Co., 330 Orange Street, Indianapolis, has been organized to manufacture ornamental metal stampings and trimmings used by lighting fixture, lamp and wrought iron manufacturers and also to make light gage sheet metal stampings for commercial purposes. The principal raw material used is light gage sheet iron and brass. All necessary equipment has been purchased. The company will not build a plant at present.

The Runnels Mfg. Co., Inc., 845 Lafayette Avenue, Terre Haute, has been organized to manufacture gas appliances, particularly a device for use in connection with household hot water supply systems. Most of the materials and equipment have been arranged for, and some contract work has been let, but manufacturing will be carried on in the company's own factory when it is built.

The Consolidated Mfg. Co., Terre Haute, has been organized to manufacture a dust protector for windows and other mechanical specialties. Present requirements of materials and equipment have been contracted for.

The Lampman Mfg. Co., Huntington, Ind., has been organized to manufacture electrical parts and automotive equipment. The company has a new plant and will be in the market for materials and probably other equipment.

The International Steel & Iron Co., Evansville, Ind., will erect an addition, 100 x 605 ft. Fred O. Weber is president.

Pacific Coast

SAN FRANCISCO, Nov. 30.

THE Monterey County Ice & Development Co., Salinas, Cal., will build a new ice-manufacturing and cold storage plant, with capacity of 175 tons per day, to cost $200,000 with machinery.

The San Diego Consolidated Gas & Electric Co., San Diego, Cal., has plans for enlargements in its steam-

operated electric power plant B to cost in excess of $850,000. Extensions are also planned in transmission lines.

The Certain-Teed Products Corporation, Richmond, Cal., manufacturer of roofing, etc., is said to be planning additions and installation of new equipment. The expansion program is reported to cost more than $100,000. Headquarters are at 100 East Forty-second Street, New York.

The Byron-Jackson Pump Co., San Francisco, has been formed under Delaware laws with capital of 95,000 shares of stock, no par value, to take over and expand the Byron-Jackson Pump Mfg. Co., 55 New Montgomery Street, with main plant at Berkeley, Cal.

The Montana Mines Operations, Inc., care of Frank H. Lerchen, 319 East Fourth Street, Tucson, Ariz., manager, has plans for a new mill at its copper properties at Oro Blanco, Ariz., to handle about 200 tons of ore per day. It is reported to cost more than $250,000 with machinery, and is scheduled for completion next spring.

The Union Oil Co., Mills Building, San Francisco, has filed plans for a one-story storage and distributing plant, to cost close to $70,000 with equipment. The engineering department of the company is in charge.

The California-Oregon Power Co., San Francisco, has work in progress on a hydroelectric power development on the Rogue River, Ore., with ultimate capacity of 48,000 kw. It is purposed to have the initial unit ready for service early in 1928, with second unit closely following, totaling 32,000 kw. A third unit of 16,000 hp., with auxiliary equipment, will be installed later. Extensions will be made in transmission lines.

W. H. Tice, Seaside, Ore., and associates have organized the Tice Lock Washer Mfg. Co., capitalized at $200,000, to establish and operate a plant at Astoria, Ore., where property has been secured under lease. Erection of initial unit will soon begin and is reported to cost more than $45,000.

Al Larson, San Pedro, Los Angeles, operating a boat-building and repair plant, has awarded general contract to the Pan-Pacific Construction Co., Citizens' National Bank Building, Los Angeles, for a new works on Terminal Island, San Pedro Harbor, one story, 64 x 120 ft., to cost about $30,000 with equipment.

The Board of Education, South Pasadena, Cal., has plans for a new high school group, with one-story manual arts building, and is expected to ask bids this month. The entire project will cost approximately $400,000. Norman F. Marsh & Co., Broadway Central Building, Los Angeles, are architects.

The Idaho Egg Producers' Association, Caldwell, Idaho, has plans for a two-story and basement cold storage and refrigerating plant, 50 x 100 ft., to cost about $45,000 with equipment. Wayland & Fennell, Idaho Building, Boise, are architects.

The Sterling Electric Products Co., Los Angeles, has purchased a five-acre site at Atlantic Avenue and Telegraph Road for a new plant and has awarded contract for the first unit, 100 x 100 ft., to S. N. Benjamin, 718 East Sixteenth Street.

Canada

TORONTO, Dec. 5.

WHILE no large lists for machine tools appeared in this market the past week, orders for single tools were in satisfactory volume, and both dealers and builders are optimistic regarding the future. A stronger demand for mining machinery and tools has developed within the past few weeks and it is reported from northern Ontario and Quebec that several mining companies are preparing to install new mills and purchase necessary tools. Sales of wood-working tools show improvement, with orders coming from many sections of the country.

The Hilltop Gold Mines, Ltd., Boston Creek, Ont., has recently placed a good sized order for mining machinery, and is arranging to purchase additional equipment, including transformer machinery, etc.

John Mansfield, president Chrysler Corporation of Canada, Tecumseh Road, Windsor, Ont., states that his company contemplates building a $3,500,000 addition to its local plant. Contract has been awarded to the S. E. Dinsmore Co., Windsor, for a two-story building, 100 x 400 ft., and a second building, 68 x 180 ft., will also be erected. The company will shortly be in the market with a machine tool list.

The Jackson, Lewis Construction Co., Federal Building, Toronto, has the contract for a new $20,000 final repair building, 100 x 100 ft., for the General Motors of Canada, Ltd., Oshawa, Ont.

The Coutlee-Muir Rubber Co., Joliette, Que., is having plans prepared for the erection of a plant for the manufacture of automobile tires, tubes, rubber goods, etc., to cost $50,000. Construction will start immediately and equipment will be purchased.

The St. Jerome Power Co., Ltd., 105 St. Peter Street, Quebec, has plans prepared by Z. Langlais, 126 St. Peter Street, for the construction of a hydroelectric plant, dam and transmission line at Belle Riviere, Quebec, to cost $150,000. Owners are asking for quotations on transformers, turbines, etc.

The Canada Glass Products, Ltd., 18 Rideau Street, Ottawa, Ont., will build an addition to its plant near Kingston, Ont., construction to be started in the spring. Architect is not yet appointed.

The Grimm Mfg. Co., 58 Wellington Street, Montreal, manufacturer of sap evaporators, sheet metal products, copper and brass products, etc., is arranging for the erection of a plant at Prince and Wellington Streets, Montreal.

Bids will be called soon for the construction of locomotive and machine shops at Point St. Charles, Montreal, for the Canadian National Railways. A. F. Byers & Co., Ltd., 340 University Street, has the contract for excavating and foundations.

It is reported that the interests behind the Pacific Paper Mills, Ocean Falls, B. C., are contemplating the erection of a newsprint mill at Campbell River, B. C., with a daily capacity of 1000 tons.

Foreign

THE West Sussex Branch of the National Farmers' Union, Chichester, Sussex, England, has concluded arrangements with a group of beet sugar manufacturers operating mills at Kelham, Ely and Kings Lynn and other points in England, for a new refinery at Chichester, to cost in excess of $2,000,000 with machinery. It is purposed to have the initial unit ready for the 1928 crop of sugar beets. The American Consulate, London, Alfred Nutting, consul general, has information regarding the project.

Percival Farquhar, 120 Broadway, New York, has contracted with the Soviet Russian Government for the construction of a steel mill at Makieffka, Southern Russia, reported to cost $20,000,000. American machinery and methods will be used. The project will be financed by Mr. Farquhar and repaid by the Soviet Government in a period of six years, when it will own the plant.

The Vamma Water Power Co. (Aktieselskabet Vamma Fossekompagni), Oslo, Norway, a subsidiary of the Hafslund Co., has arranged for a bond issue of $5,000,000 to be sold in the United States by Lee, Higginson & Co., 43 Exchange Place, New York, bankers, a portion of the fund to be used for extensions and improvements in hydroelectric power properties in the vicinity of Oslo and Oslo Fjord.

The Kellogg Co., Battle Creek, Mich., manufacturer of grain food products, has approved plans for a new six-story plant at Sydney, Australia, 64 x 300 ft., comprising a self-contained unit, equipped for all milling and processing operations, to cost in excess of $650,000 with machinery. A hospital, cafeteria and other welfare departments will be installed for employees.

Plans are under way for a new airport and mooring mast at Seville, Spain, with shops for aircraft manufacturing and repairs, oil storage and distributing plant, and other mechanical facilities, estimated to cost close to $1,000,000. It will be used for an airship line between the port and Buenos Aires, Argentina. The American Consulate, Buenos Aires, Robert W. Bliss, ambassador, has information regarding the project.

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